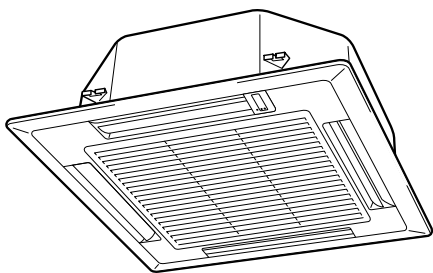


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FDT - 8 Series (Cassette)

FDC - 8 Series (Outdoor)

Technical data for R22 and R407C Systems

SYSTEM REFERENCE			2088	2588	3088	3088(3ph)	4088	5088
PERFORMANCE								
Cooling performance nom.	(1)	KW	5.00	5.70	7.10	7.10	10.00	12.50
Cooling U K Conditions	(2)	KW	4.80	5.47	6.82	6.82	9.60	12.00
Sensible Cooling UK	(3)	KW	3.51	4.05	5.05	5.05	6.91	8.28
Heating Performance (HP only)		KW	5.40	6.10	8.00	8.00	11.20	14.00

ELECTRICAL DATA								
System Power connection			Mains to outdoor unit first. Interconnecting wiring - 3 wires + Earth, for cooling, 5 wires + Earth, for Heat Pump					
Run current - cooling	A		8.1	9.4	14.4	5.5/ph	8.1/ph	10.3/ph
Start current max. L R A	A		44	51	95	45/ph	53/ph	74/ph
Recommended Fuse Rating (Local)	(5)	A	20	30	30	15/ph	15/ph	20/ph

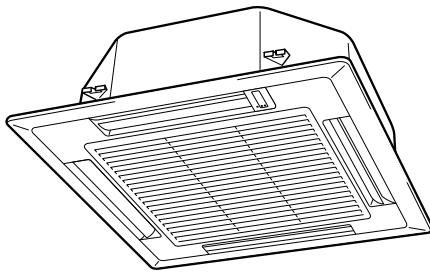
INDOOR UNIT ref: FDT 8 Series		FDT208	FDT258	FDT308	FDT308	FDT408	FDT508
Dimension - Unit H x W x D	mm	215 x 700 x 700	260 x 840 x 840			320 x 840 x 840	
Net Weight	kg	23	30	30	30	34	36
Fan Specification		Turbo Fan x 1					
Motor Rating	W	30 x 1	25 x 1	30 x 1	30 x 1	80 x 1	130 x 1
Airflow (6) High / low speed	m ³ /s	0.23 / 0.16	0.26 / 0.18	0.28 / 0.20	0.28 / 0.20	0.43 / 0.31	0.46 / 0.33
Sound level at 1 m below unit high / low	dBA	38 / 33	39 / 35	41 / 35	41 / 35	48 / 40	49 / 43
Safety Control		Internal thermostat for fan motor. Frost protection thermostat.					
Condensate Lift Pump - Max lift (7)	mm	700	700	700	700	700	700
Condensate Connection Size o.d.	mm	25	25	25	25	25	25
Fresh Air Inlet facility		Inlet facility on all models					
Exhaust Air Duct facility		Branch duct facility on all models					
Refrigerant Control		Capillary tube.					
Pipe Termination Sizes o.d.	ins	5/8	5/8	5/8	5/8	3/4	3/4
	ins	1/4	3/8	3/8	3/8	3/8	3/8
Filter		Long life filter x 1(Washable)					
Remote Control (wired)		Multi function wired controller with alternative temperature sensor					

OUTDOOR UNIT ref: FDC 8		FDC208	FDC258	FDC308	FDC308(3ph)	FDC408(3ph)	FDC508(3ph)
TECHNICAL DATA							
Dimension - Unit H x W x D	mm	690 x 880 x 290	845 x 880 x 340			1050x 920 x 340	1250 x 920 x 340
Net Weight	kg	49	55	74	74	90	101
Fan Specification		Propeller Fan x 1				Propeller Fan x 2	
Motor Rating	W	55 x 1	55 x 1	55 x 1	55 x 1	40 x 2	65 x 2
Sound level at 1 metre in front	dBA	52	52	52	52	54	55
Refrigerant type		R22 OR R407C					
Refrigerant factory charge R22 / R407C	kg	0.98 / 0.98	1.1 / 1.2	1.4 / 1.75	1.4 / 1.75	1.7 / 2.12	1.9 / 2.58

REFRIGERANT PIPING								
Pipe Termination Sizes o.d.	ins	5/8	5/8	5/8	5/8	3/4	3/4	
	ins	1/4	3/8	3/8	3/8	3/8	3/8	
Maximum pipe run	m	30	30	50	50	50	50	
Max height diff. Outdoor unit above / below	m	30 / 15	30 / 15	30 / 15	30 / 15	30 / 15	30 / 15	

- NOTES**
- Nominal cooling rated at ISO-A, JIS B8616 Outdoor: 35°C DB / 24°C WB Indoor: 27°C DB / 19°C WB
 - U K Cooling Outdoor: 30°C DB / 20°C WB Indoor: 23°C DB / 17°C WB
 - Sensible Cooling calculated at UK conditions, at standard air volume.
 - Heating Performance rated at: Outdoor 7°C DB / 6°C WB Indoor: 20°C DB
 - Recommendations are for supply to outdoor unit. Use motor rated fuse or MCB. Requirement may vary depending on site conditions.
 - CEN & HEN = 1ph CES & HES = 3ph.
 - Condensate lift measured from ceiling line.
 - Cooling only systems available in R22 models 2088 & 2588. Cooling only available with R22 FDC 6 Series outdoor units, and all R407C FDC 8 Series.





FDT - 8 Series (Cassette)

FDC - 6 Series (Outdoor)

Technical data for R22 and R407C Systems

SYSTEM REFERENCE			3086	3086 (3ph)	4086	5086
PERFORMANCE						
Cooling performance nom.	(1)	KW	7.10	7.10	10.20	12.50
Cooling UK Conditions	(2)	KW	6.82	6.82	9.79	12.00
Sensible Cooling UK	(3)	KW	5.05	5.05	7.05	8.28
Heating Performance (HP only)		KW	7.30	7.30	10.50	12.80

ELECTRICAL DATA						
System Power connection			Mains to outdoor unit first.	Interconnecting wiring - 3 wires + Earth, for cooling,		5 wires + Earth, for Heat Pump
Run current - cooling	A		16.3	6.0/ph	7.5/ph	10.0/ph
Start current max. L R A	A		89	43/ph	45/ph	68/ph
Recommended Fuse Rating (Local)	(5)	A	30	15/ph	15/ph	20/ph

INDOOR UNIT ref: FDT 8 Series			FDT308	FDT308	FDT408	FDT508
Dimension - Unit H x W x D	mm		260 x 840 x 840		320 x 840 x 840	
Net Weight	kg		30	30	34	36
Fan Specification			Turbo Fan x 1			
Motor Rating	W		30 x 1	30 x 1	80 x 1	130 x 1
Airflow (6)	High / low speed	m ³ /s	0.28 / 0.20	0.28 / 0.20	0.43 / 0.31	0.46 / 0.33
Sound level at 1 metre below	high / low	dBA	41 / 35	41 / 35	48 / 40	49 / 43
Safety Control			Internal thermostat for fan motor. Frost protection thermostat.			
Condensate Lift Pump - Max lift (7)	mm		700	700	700	700
Condensate Connection Size	o.d.	mm	25	25	25	25
Fresh Air Inlet facility			Inlet facility on all models			
Exhaust Air Duct facility			Branch duct facility on all models			
Refrigerant Control			Capillary tube.			
Pipe Termination Sizes	o.d.	ins	5/8	5/8	3/4	3/4
		ins	3/8	3/8	3/8	3/8
Filter			Long life filter x 1(Washable)			
Remote Control (wired)			Multi function wired controller with alternative temperature sensor			

OUTDOOR UNIT ref: FDC 6			FDC306	FDC306(3ph)	FDC406(3ph)	FDC506(3ph)
Dimension - Unit H x W x D	mm		844 x 950 x 340		1250 x 950 x 340	
Net Weight	kg		69	69	86	91
Fan Specification			Propeller Fan x 1		Propeller Fan x 2	
Motor Rating	W		60 x 1	60 x 1	60 x 2	60 x 2
Sound level at 1 metre in front		dBA	56	56	57	59
Refrigerant			R22 ONLY			
Refrigerant factory charge	kg		1.3	1.3	1.6	2.3

REFRIGERANT PIPING						
Pipe Termination Sizes	o.d.	ins	5/8	5/8	3/4	3/4
		ins	3/8	3/8	3/8	3/8
Maximum pipe run		m	30	30	30	30
Max height diff. Outdoor unit above / below		m	15	15	15	15

- NOTES**
- Nominal cooling rated at ISO-A, JIS B8616
 - U K Cooling
 - Sensible Cooling calculated at UK conditions, at standard air volume.
 - Heating Performance rated at:
 - Power supply to outdoor unit. Use motor rated fuse or MCB. Requirement may vary depending on site conditions.
 - CEN & HEN = 1ph CES & HES = 3ph.
 - Condensate lift measured from ceiling line.
 - Cooling and heat pump systems available in R22 models 2088 & 2588.
- Outdoor: 35°C DB / 24°C WB Indoor: 27°C DB / 19°C WB
 Outdoor: 30°C DB / 20°C WB Indoor: 23°C DB / 17°C WB
 Outdoor: 7°C DB / 6°C WB Indoor: 20°C DB

Installation of FDT (Cassette)

Application

The unit is designed for most commercial applications, i.e. shops, offices, gyms, meeting rooms, bars, restaurants, etc. It should not be installed in an area contaminated by oil, chemicals, or an area with steam or excessive humidity, or hazardous substances, i.e. flammable gases, vapours, resins, thinners, petroleum, acids.

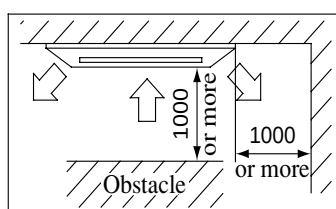
Do not install adjacent to equipment generating magnetic waves or high frequency signals, as the generated noise may cause equipment malfunction.

Unit location

Select a suitable location within the room to allow optimum air distribution to all parts of the conditioned space. The minimum distance from a wall or obstruction is 1000mm.

The unit should be located so as not to cause draft disturbance to a person located directly in the path of the air discharge.

Installation space



Unit Location
avoiding obstruction
Dimensions mm

Recommended floor to ceiling height	minimum	2250mm
	maximum	3600mm
Recommended minimum ceiling void space	FDT 208	225mm
	FDT 258, 308	270mm
	FDT 408, 508	330mm

See also space collar installation for restricted height ceiling voids

Preparation for installation

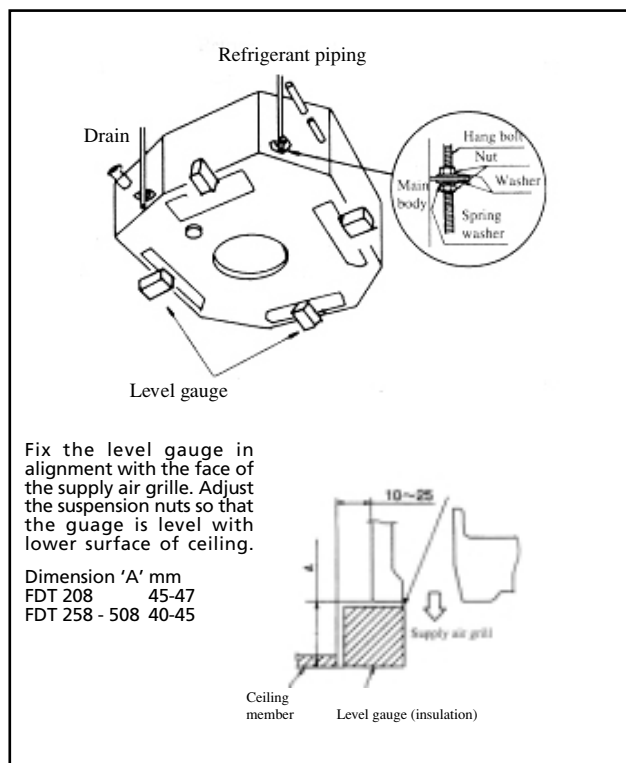
A pattern cardboard sheet is enclosed with the packing, indicating the ceiling opening size, and the required position of the hanging bolts. Check measurements with the drawings, and make opening.

Fix suspension bolts (4 no. M8 or M10 – supplied by installer) into the building construction, in the required positions. The bolts and fixings must have a minimum resistive force of 50kg. The suspension bolts should be cut to length, to finish approximately 70mm above ceiling line.

Unit installation

Lift the unit into position, central within the opening, and secure with nuts and washers on the suspension bolts, adjusting unit height using the level gauge provided.

Ensure pipe terminations are correctly positioned, facing in the right direction. Use a spirit level to ensure unit is horizontal.



Condensate piping

The FDT cassette includes a condensate lift pump, capable of pumping upwards 700mm above the ceiling line. It is important to keep within this limit.

The lift should be installed vertically from the drain outlet. If installed at an incline, this should not deviate more than 100mm from the vertical (see piping diagram). This is to prevent too much water being contained in the vertical lift, which would flood back to the unit and overflow when the power is switched off.

The pipe termination is of rigid pvc, 25mm o.d. A short length of flexible connection is provided in the installation kit, together with a circular clip, terminating in 25mm i.d. (32mm o.d.) connection.

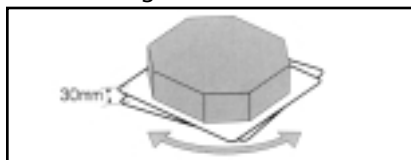
Please refer to page 23 Condensate Drain Installation & Recommendations.



Safety Warning: Refer to safety data on back cover of this manual

Fascia panel fixing

- Check the unit is level, using the level gauges provided.
- Screw two of the fixing bolts into two diagonally opposed sockets.
- Locate the panel onto the bolts, and insert the two remaining bolts.



The fascia panel can be rotated on its locating screws to allow accurate alignment with the ceiling grid

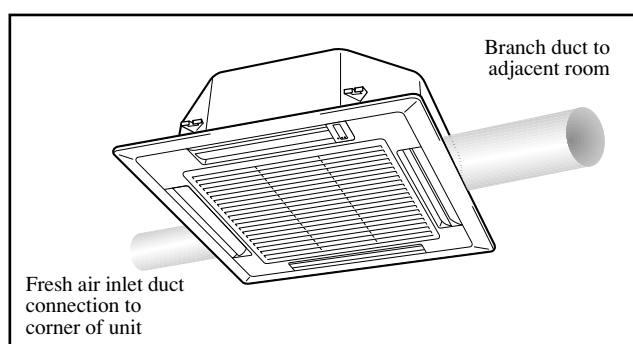
- Fix the panel only in the position indicated in the packed instructions, i.e. with all four air outlets correctly aligned, otherwise there will be air leakage.

Fresh air intake

The FDT cassette includes an aperture in one corner for the introduction of fresh air. A small knock out is provided in the corner section of the unit (in one position only). The position and dimensions are shown on the drawing below.

The fresh air inlet is on the suction side of the turbo fan, and will draw in a small quantity of fresh air, provided the inlet duct is not longer than 5 metres. The inlet duct should have a cross section area of at least 750mm².

Where a fan is used to provide a small positive pressure for the fresh air intake, it is essential the volume of air does not exceed 10% of the air volume of the unit. Too much fresh air entering the unit will result in excessive noise.



RCD remote control installation (wired type)

Please refer to page 8 for RCD installation instructions and customise settings.



Remote control (wireless infra-red type)

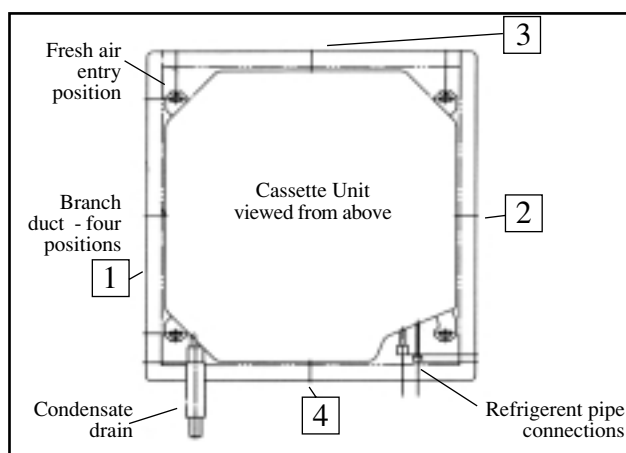
The FDTN version of the 8 Series cassette systems is supplied with an infra-red controller. A wall mounted bracket is provided. For operational details, please refer to page 18.

Branch duct

It is possible to deliver a proportion (20% max) of the conditioned air to a small adjacent area using a branch duct connection to the side of the FDT cassette unit.

The branch duct can be connected at positions on four sides of the unit. There are knock-out sections, allowing the installer to make an opening to suit the size of the connecting duct. The suggested size for the branch duct is 150mm dia. or similar.

Where a fan is used to provide a positive pressure for the branch duct, the air volume should not exceed 20% of the unit air volume.



Further Information

Space collar installation

page 5

Refrigerant piping installation

page 19

Electrical wiring installation

page 21

Condensate drain installation

page 23

Outdoor unit installation & location

page 25

Remote control RCD set up

page 8

Group control set up

page 9

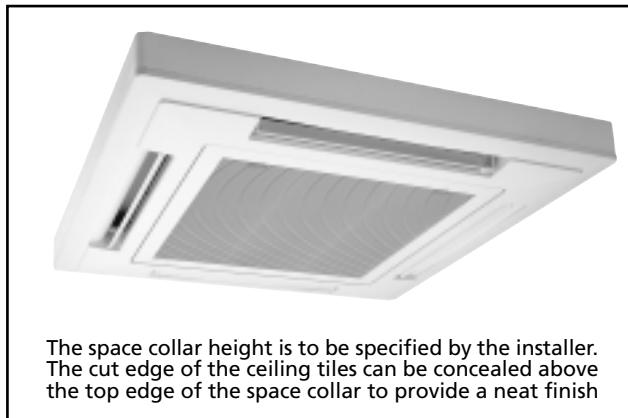
Superlynk network SCA-DE interface

page 22

Installation of FDT Space Collar

For installation of FDT cassette in restricted height ceiling voids.

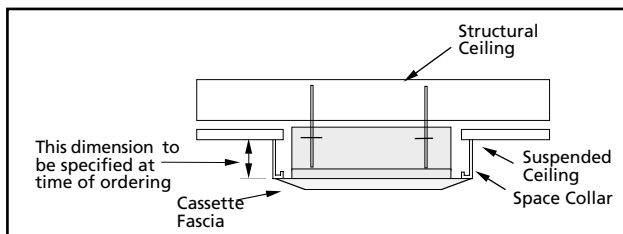
The SPACE COLLAR is used to provide a decorative enclosure for the FDT cassette where the unit protrudes below the level of the ceiling. This allows cassette units to be installed where there is a restricted ceiling void.



The space collar is available in different heights, to allow for the space available within the ceiling void. The collars are precision moulded in glass fibre reinforced plastic, colour textured to match the light grey cassette fascia panel. The ceiling tiles can be installed resting on top of the finished edge of the collar, leaving a neat finish to the installation.

NOTE: It is important to make provision for the connection of refrigerant piping and condensate drain, which may be restricted where there is a minimal ceiling void.

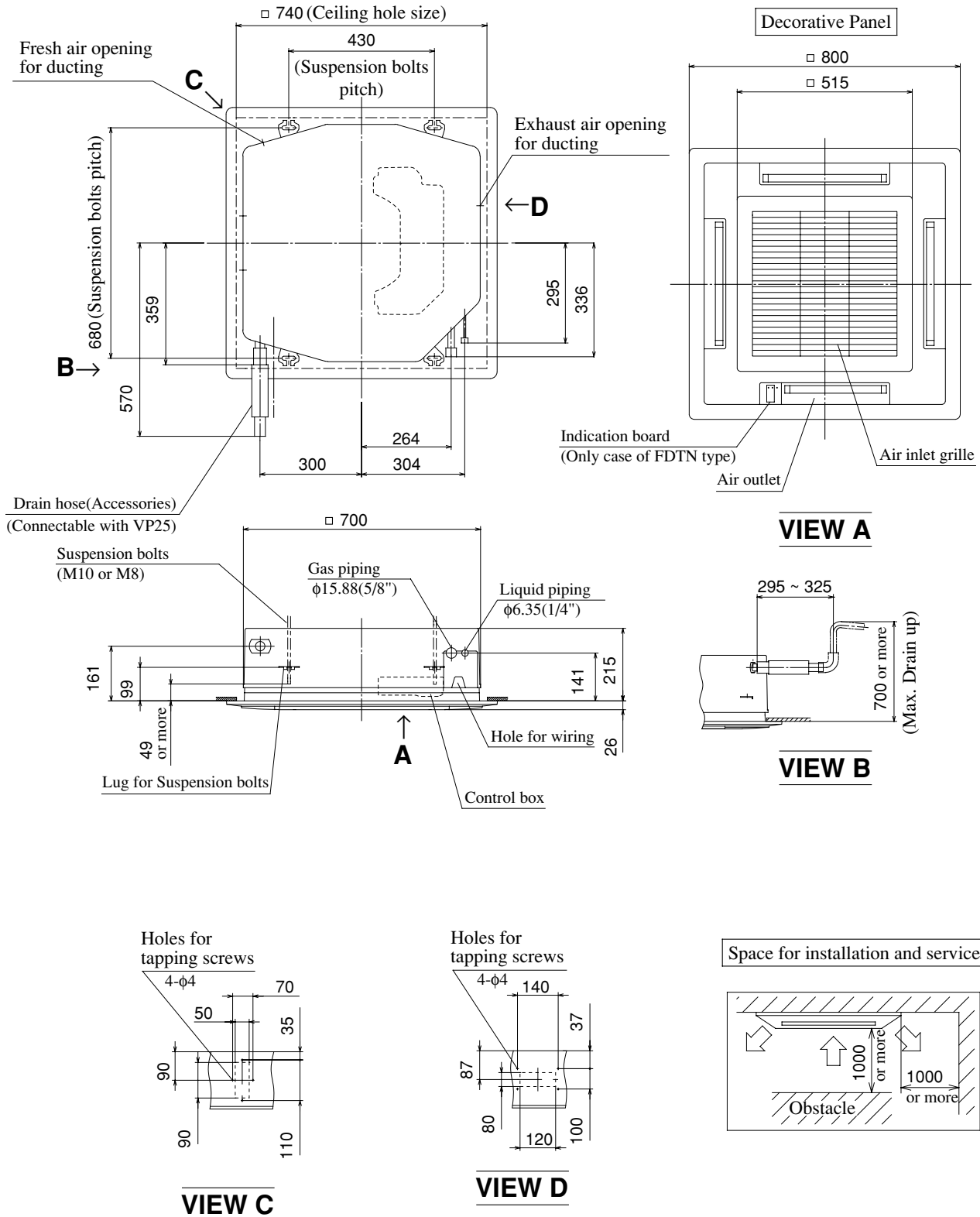
The height of the space collar must be specified at the time of ordering. The model reference of the FDT cassette must also be specified.



FDT Cassette 208

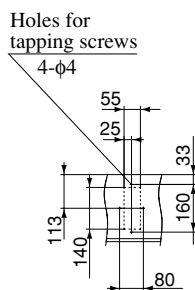
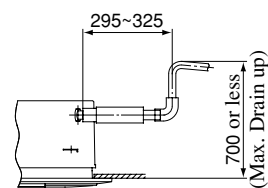
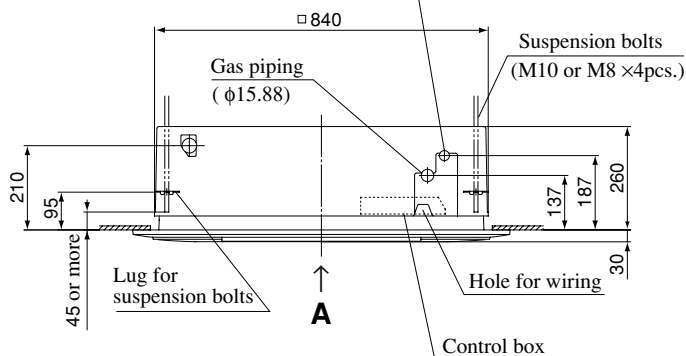
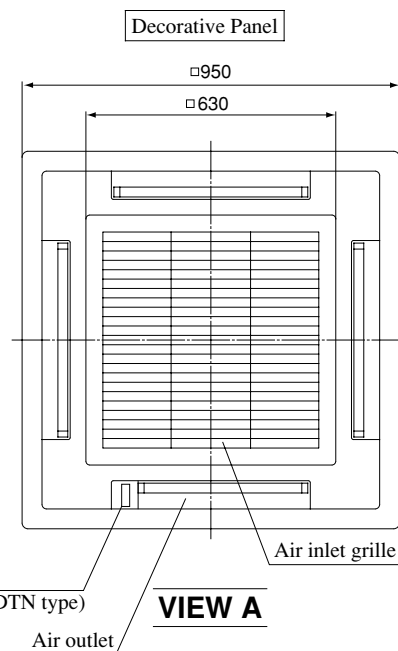
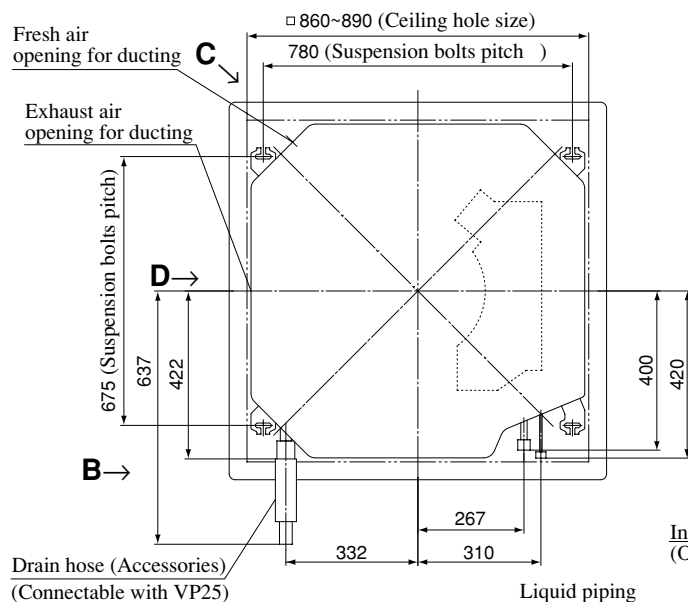
(1) Indoor unit

Models FDTN208H, FDT208-A

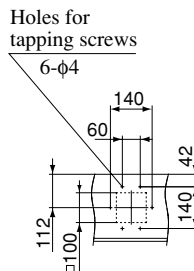


Models FDTN258H, 308H, FDT258-A, 308-A

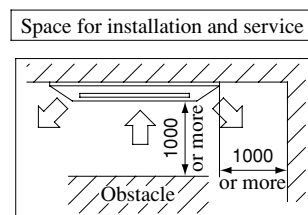
Unit : mm



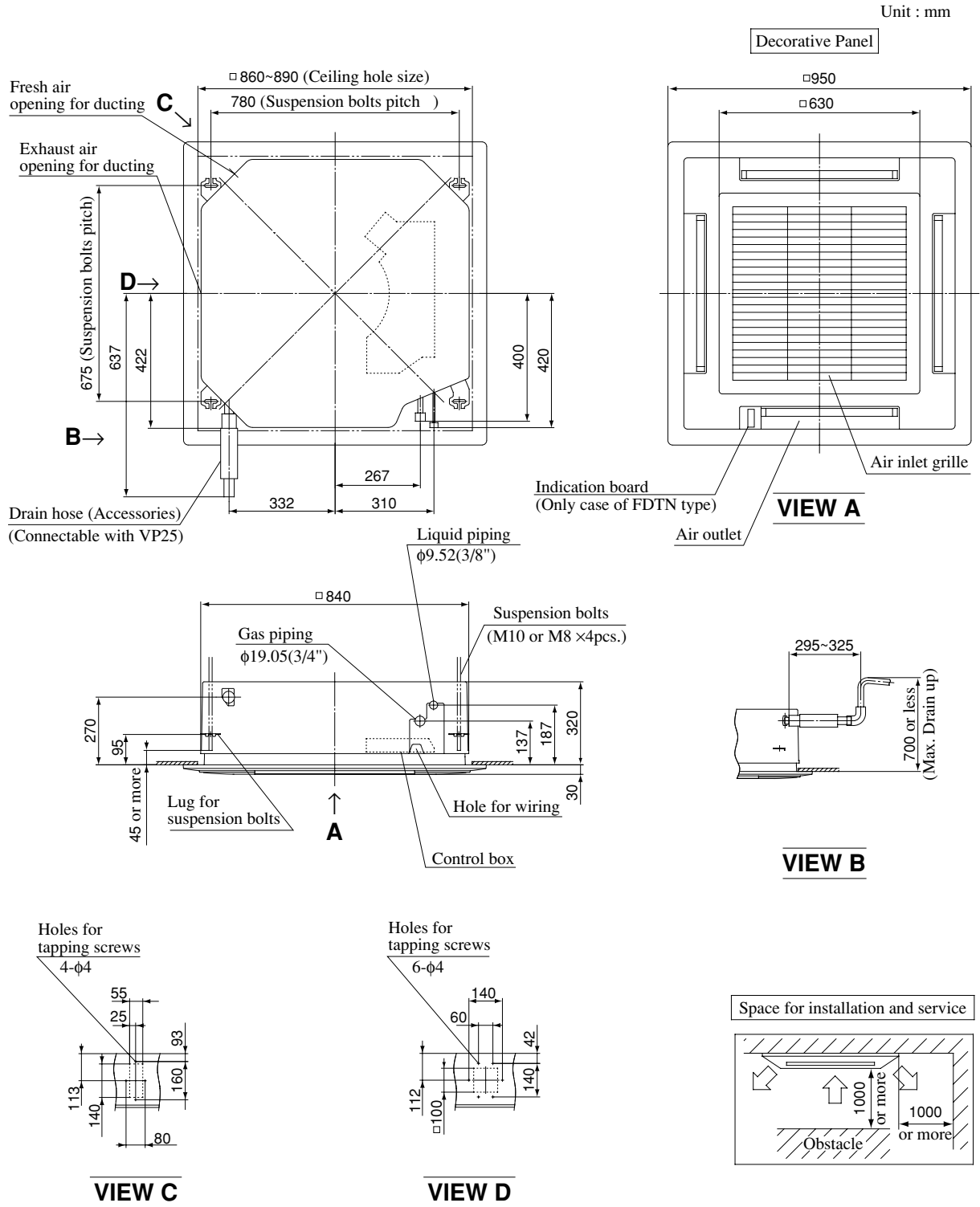
VIEW C



VIEW D



Models FDTN408H, 508H, FDT408-A, 508-A



RCD Remote Control (wired)

Installation, Wiring & Setting

RCD installation



The RCD is a multi function touch pad controller, with LED display. It should be located away from direct sunlight, water splashing, high humidity, or a heat source. It can be located in another part of the building if

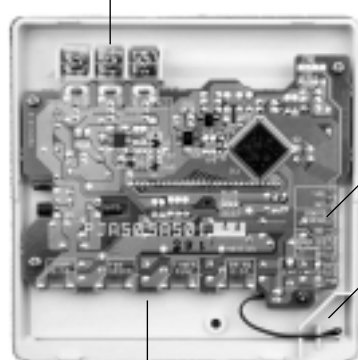
required. The RCD includes a temperature sensor, which can be utilised as an alternative to the indoor unit return air sensor if preferred.

- To install, remove the front panel of the controller from the back by prizing apart.
- For surface wiring, make a small cut in the flange of the back, using a sharp knife.
- WIRE ENTRY IS FROM TOP ONLY.
- Fix the back to the wall.
- Connect three wires to XYZ terminal, corresponding to the XYZ terminals on the indoor unit. ENSURE THE XYZ CONNECTIONS ARE WIRED CORRECTLY.
- Use shielded wires, minimum 0.3mm², for up to 100m length.
- Refer to Engineering Data Manual for longer extensions

RCD customised setting

On the back of the RCD board is a series of dip-switches and jumper wires, which allow alteration and elimination of certain functions and displays. This allows the installer to customise, or simplify the controller to suit the application, and the client's requirements. The RCD includes an air temperature sensor, which can be utilised as an alternative to the unit integral return air sensor.

Connection to indoor unit terminals XYZ



Dip switch customise settings

Remote Sensor (alternative)

Jumper wire Customise display settings

Time clock operation

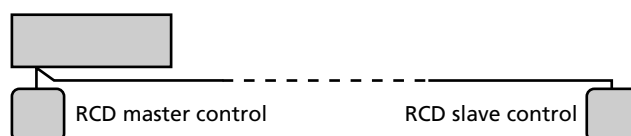
The RCD includes a 24 hour programmable on/off timer. The programme is set up by adjusting the display using the key pad of the controller. Where an external time control is used (through the CnT port) in preference to the RCD timer, the 24 hour time clock display can be removed, to avoid confusion by the user. This is achieved by cutting jumper wire J3.

Where there is a requirement for a 7-day programmable timer (supplied by the installer), this should be wired separately into the CnT port of the indoor unit PCB.

Master / slave control

Where two controllers are wired to one unit (or one group of units), one is designated the master, the other the slave. This arrangement may be required in a large building, where individual remote controls are located in offices or different areas of a store, and additional controllers are situated in the building manager's office. The unit (or group) will respond to the last command from either the master or the slave.

In some applications, where the RCD integral sensor is required to operate the system, it may need to be located out of reach at high level. The installation of a second RCD would allow the user to operate and adjust the system from a remote location, using the master/slave arrangement.



For control operation functions, please refer to page 10

SW1	on off	Cooling only Heat pump
SW2	on off	Remote sensor enabled Remote sensor disabled
SW3	on off	Power re-start on Power re-start off
SW4	on off	Remote Master Remote Slave

J1	Link No link	Return air temp - displayed Return air temp - not displayed
J2	Link No Link	Fan display High, Med, Low Fan display High, Low
J3	Link No Link	Timer function displayed Timer function disabled
J4	Link No Link	Swing function displayed Swing function disabled

RCD Remote Control *(wired)*

Installation, Wiring & Setting

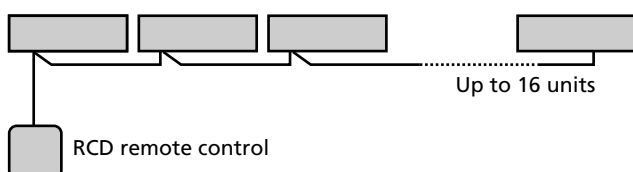
Group control

The RCD can be used as a Group Control for up to 16 units. The RCD will determine the fan speed, heat / cool / auto mode, and temperature selection for all units together.

The units will then operate in the same mode, with each individual temperature sensor independently operating the heating or cooling of each system.

The indoor unit PCB has an address dial, which must be adjusted to a group address number for each unit in the group, i.e. 0,1,2,3, etc. The address setting also provides a time delay for sequential compressor starts.

Group control wiring



The units in the same Group have control board terminals X,Y,Z connected in parallel by 3-core screened wiring. One single controller, or two controllers (master/slave) are connected to the X,Y,Z wiring.

Compressor delay timer

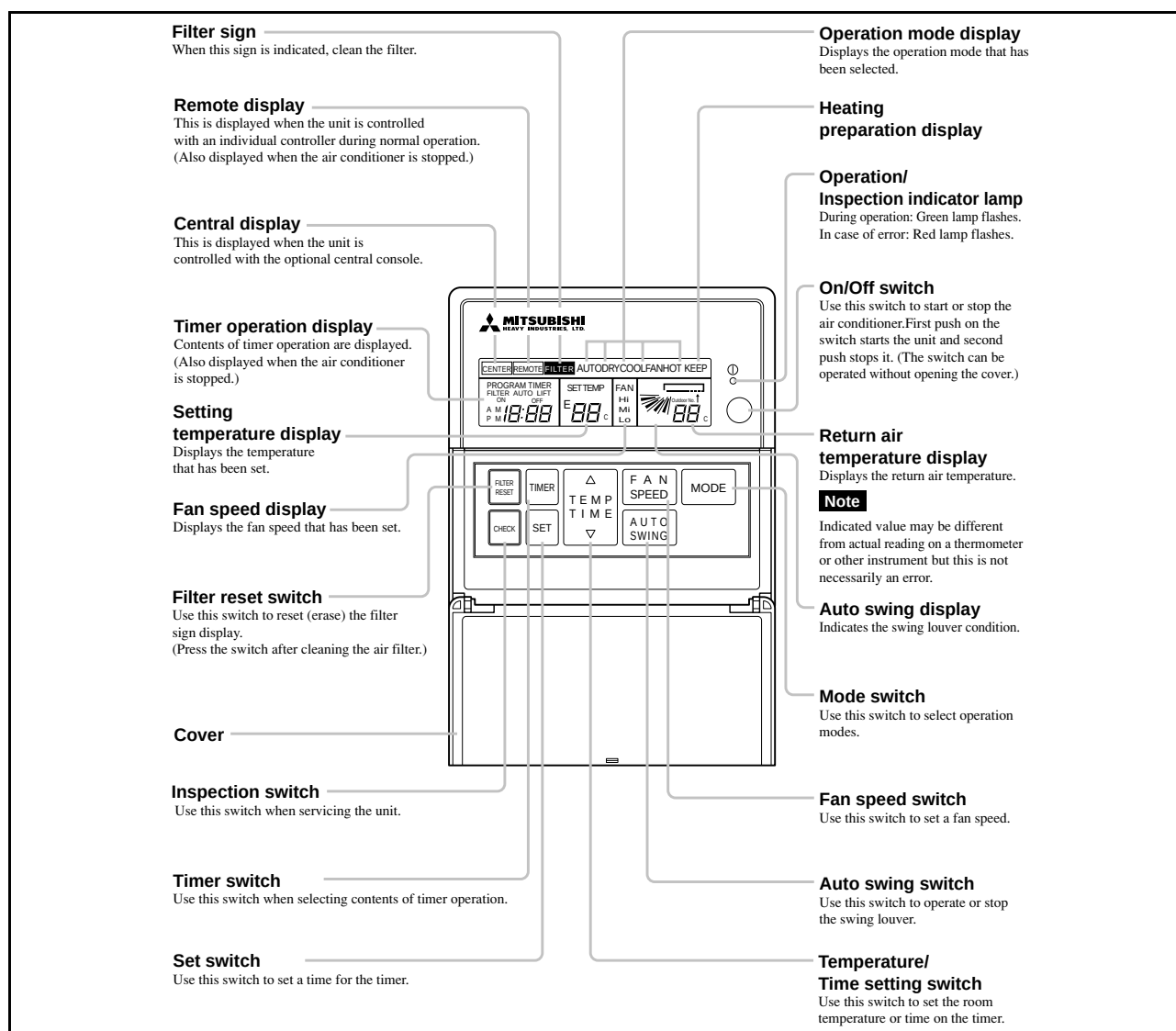
The address setting of each individual unit within the group also has the function of providing a delay of 1 second between compressor starts. This is to prevent a large power surge, which would result from all compressors starting together.

The delay timer function is set into 8 sequential starts, with pairs of units starting together.

Unit Address Number	Start delay interval (sec.)
0 & 8	0
1 & 9	1
2 & 10	2
3 & 11	3
4 & 12	4
5 & 13	5
6 & 14	6
7 & 15	7



RCD Remote Control Functions

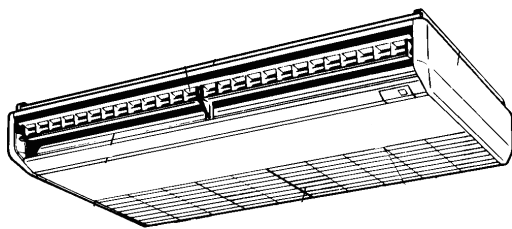


Fault diagnosis

The RCD wired controller includes a fault diagnostic display. For complete information on error codes and the required rectification, please refer to the Maintenance Data included with the unit instructions.

Error Codes

E1	control wiring broken pcb defective	E8	heat overload on indoor heat exchanger indoor heat exchanger thermistor short circuit
E6	indoor heat exchanger thermistor defective connection to thermistor defective	E9	condensate pump wiring disconnected or faulty float switch defective defective output circuit on indoor pcb
E7	indoor return air sensor defective connection to thermistor defective defective input circuit on pcb	E57	refrigerant leak indoor heat exchanger thermistor short circuit defective thermistor input circuit on pcb



FDEN - 8 Series (ceiling)

FDC - 8 Series (outdoor)

Technical data for R22 and R407C Systems

SYSTEM REFERENCE			2088	2588	3088	3088(3ph)	4088	5088
PERFORMANCE								
Cooling performance nom.	(1)	KW	5.00	5.70	7.10	7.10	10.00	12.50
Cooling U K Conditions	(2)	KW	4.80	5.47	6.82	6.82	9.60	12.00
Sensible Cooling UK	(3)	KW	3.51	4.05	5.05	5.05	6.91	8.28
Heating Performance (HP only)		KW	5.40	6.10	8.00	8.00	11.20	14.00

ELECTRICAL DATA								
System Power connection			Mains to outdoor unit first. Interconnecting wiring - 3 wires + Earth, for cooling. 5 wires plus + Earth, for Heat Pump					
Run current - cooling	A		8.2	9.4	13.9	5.1/ph	7.6/ph	9.3/ph
Start current max. L R A	A		44	51	95	45/ph	53/ph	74/ph
Recommended Fuse Rating (Local)	(5)	A	20	30	30	15/ph	15/ph	20/ph

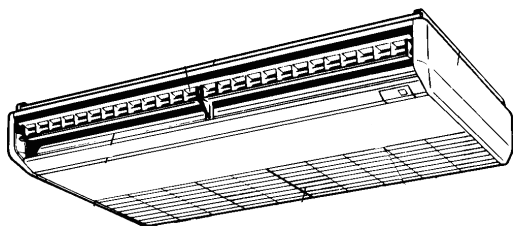
INDOOR UNIT ref: FDEN 8 Series		FDEN208	FDEN258	FDEN308	FDEN308	FDEN408	FDEN508
Dimension - Unit H x W x D	mm	184 x 1000 x 650	184 x 1260 x 650			239 x 1260 x 650	239 x 1470 x 650
Net Weight	kg	22	27	27	30	34	40
Fan Specification		Centrif. fan x 2	Multi-blade centrifugal fan x 4				
Motor Rating	W	40 x 1	25 x 2	35 x 2	35 x 2	35 + 55	55 x 2
Airflow (6) High / low speed	m ³/s	0.23 / 0.16	0.26 / 0.17	0.28 / 0.19	0.28 / 0.19	0.43 / 0.31	0.46 / 0.33
Sound level at 1 metre below high / low	dBA	43 / 38	44 / 39	45 / 39	45 / 39	49 / 43	50 / 44
Safety Control		Internal thermostat for fan motor. Frost protection thermostat.					
Condensate Lift Pump – Max lift	mm	N / A					
Condensate Connection Size o.d.	mm	20	20	20	20	20	20
Fresh Air Inlet facility		Aperture required in rear section of unit – max 10% of unit air volume					
Exhaust Air Duct facility		N / A					
Refrigerant Control		Capillary tube.					
Pipe Termination Sizes o.d.	ins	5/8	5/8	5/8	5/8	3/4	3/4
	ins	1/4	3/8	3/8	3/8	3/8	3/8
Filter		Polypropylene net x 2 (Washable)				Polypropylene net x 3 (Washable)	
Remote Control (wireless infra red)		Multi function hand held controller, supplied with wall bracket					

OUTDOOR UNIT ref: FDC 8		FDC208	FDC258	FDC308	FDC308(3ph)	FDC408	FDC508
TECHNICAL DATA							
Dimension - Unit H x W x D	mm	690 x 880 x 290	845 x 880 x 340			1050 x 920 x 340	1250 x 920 x 340
Net Weight	kg	49	55	74	74	90	101
Fan Specification		Propeller Fan x 1				Propeller Fan x 2	
Motor Rating	W	55 x 1	55 x 1	55 x 1	55 x 1	40 x 2	65 x 2
Sound level at 1 metre in front	dBA	52	52	52	52	54	55
Refrigerant type		R22 OR R407C					
Refrigerant factory charge R22 / R407C	kg	0.98 / 0.98	1.1 / 1.2	1.4 / 1.75	1.4 / 1.75	1.7 / 2.12	1.9 / 2.58

REFRIGERANT PIPING							
Pipe Termination Sizes o.d.	ins	5/8	5/8	5/8	5/8	3/4	3/4
	ins	1/4	3/8	3/8	3/8	3/8	3/8
Maximum pipe run	m	30	30	50	50	50	50
Max height diff. Outdoor unit above / below	m	30 / 15	30 / 15	30 / 15	30 / 15	30 / 15	30 / 15

- NOTES**
- Nominal cooling rated at ISO-A, JIS B8616 Outdoor: 35 °C DB / 24 °C WB Indoor: 27 °C DB / 19 °C WB
 - U K Cooling Outdoor: 30 °C DB / 20 °C WB Indoor: 23 °C DB / 17 °C WB
 - Sensible Cooling calculated at UK conditions, at standard air volume.
 - Heating Performance rated at: Outdoor 7 °C DB / 6 °C WB Indoor: 20 °C DB
 - Recommendations are for supply to outdoor unit. Use motor rated fuse or MCB. Requirement may vary depending on site conditions.
 - CEN & HEN = 1ph CES & HES = 3ph.
 - Cooling only systems available in R22 models 2088 & 2588. Cooling only available with R22 FDC 6 Series outdoor units, and all R407C FDC 8 Series.





FDEN - 8 Series (ceiling)

FDC - 6 Series (outdoor)

Technical data for R22 and R407C Systems

SYSTEM REFERENCE			3086	3086 (3ph)	4086	5086
PERFORMANCE						
Cooling performance nom.	(1)	KW	7.10	7.10	10.20	12.50
Cooling UK Conditions	(2)	KW	6.82	6.82	9.79	12.00
Sensible Cooling UK	(3)	KW	5.05	5.05	7.05	8.28
Heating Performance (HP only)		KW	7.30	7.30	10.50	12.80

ELECTRICAL DATA						
System Power connection			Mains to outdoor unit first.	Interconnecting wiring - 3 wires + Earth, for cooling,	5 wires + Earth, for Heat Pump	
Run current - cooling	A		15.6	5.3/ph	7.3	9.8
Start current max. L R A	A		89	43/ph	45/ph	68/ph
Recommended Fuse Rating (Local)	(5)	A	30	15/ph	15/ph	20/ph

INDOOR UNIT ref: FDT 8 Series		FDEN308	FDEN308	FDEN408	FDEN508
Dimension - Unit H x W x D	mm	184 x 1260 x 650		239 x 1260 x 650	239 x 1470 x 650
Net Weight	kg	27	27	34	40
Fan Specification		Multi-blade centrifugal fan x 4			
Motor Rating	W	35 x 2	35 x 2	33 + 55	55 x 2
Airflow (6) High / low speed	m ³/s	0.28 / 0.19	0.28 / 0.19	0.43 / 0.31	0.46 / 0.33
Sound level at 1 metre below - high / low	dBA	43 / 38	43 / 38	49 / 43	50 / 44
Safety Control		Internal thermostat for fan motor. Frost protection thermostat.			
Condensate Lift Pump – Max lift	mm	N / A			
Condensate Connection Size o.d.	mm	20	20	20	20
Fresh Air Inlet facility		Aperture required in rear section of unit – max 10% of unit air volume			
Exhaust Air Duct facility		N / A			
Refrigerant Control		Capillary tube.			
Pipe Termination Sizes o.d.	ins	5/8	5/8	3/4	3/4
	ins	3/8	3/8	3/8	3/8
Filter		Polypropylene net x 2 (Washable)		Polypropylene net x 3 (Washable)	
Remote Control (wireless infra red)		Multi function hand held controller, supplied with wall bracket			

OUTDOOR UNIT ref: FDC 6			FDC306	FDC306(3ph)	FDC406(3ph)	FDC506(3ph)
Dimension - Unit H x W x D	mm		844 x 950 x 340		1250 x 950 x 340	
Net Weight	kg		69	69	86	91
Fan Specification			Propeller Fan x 1		Propeller Fan x 2	
Motor Rating	W		60 x 1	60 x 1	60 x 2	60 x 2
Sound level at 1 metre in front	dBA		56	56	57	59
Refrigerant			R22 ONLY			
Refrigerant factory charge	kg		1.3	1.3	1.6	2.3

REFRIGERANT PIPING						
Pipe Termination Sizes o.d.	ins		5/8	5/8	3/4	3/4
	ins		3/8	3/8	3/8	3/8
Maximum pipe run	m		30	30	30	30
Max height diff. Outdoor unit above / below	m		15	15	15	15

- NOTES**
- Nominal cooling rated at ISO-A, JIS B8616 Outdoor: 35°C DB / 24°C WB Indoor: 27°C DB / 19°C WB
 - UK Cooling Outdoor: 30°C DB / 20°C WB Indoor: 23°C DB / 17°C WB
 - Sensible Cooling calculated at UK conditions, at standard air volume.
 - Heating Performance rated at: Outdoor 7°C DB / 6°C WB Indoor: 20°C DB
 - Power supply to outdoor unit. Use motor rated fuse or MCB. Requirement may vary depending on site conditions.
 - CEN & HEN = 1ph CES & HES = 3ph.
 - Cooling and heat pump systems available in R22 models 2088 & 2588.

Installation of FDEN Ceiling Suspended Unit

Safety Warning: Refer to safety data on back cover of this manual

Application

The unit is designed for most commercial applications, i.e. shops, offices, gyms, meeting rooms, bars, restaurants, etc. It should not be installed in an area contaminated by oil, chemicals, or an area with steam or excessive humidity, or hazardous substances, i.e. flammable gases, vapours, resins, thinners, petroleum, acids.

Do not install adjacent to equipment generating magnetic waves or high frequency signals, as the generated noise may cause equipment malfunction.

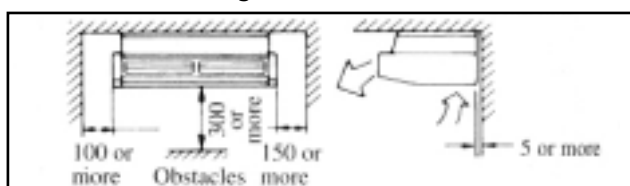
Unit location

Select a suitable location within the room to allow optimum air distribution to all parts of the conditioned space. The rear of the unit can be installed adjacent to a wall (5mm clearance), allowing pipework and electrical connections to be concealed.

The unit should be located so as not to cause draft disturbance to a person located directly in the path of the air discharge. Please note: Unit sizes 408 and 508 have high air volume, and are normally suited to retail sites, or large open plan areas. Consideration must be given to the discharge air velocity if applying the larger size units to an office environment.

Installation space

Unit location avoiding obstructions (dim. mm)



Model	208	258	308	408 / 508
Air throw (metres)	7.5	8.0	9.0	9.5
airflow speed at above distance = 0.5m/s				

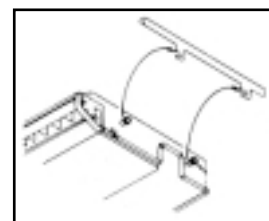
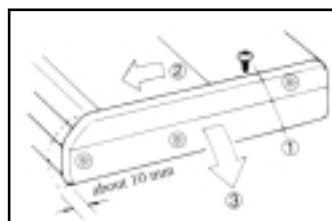
Preparation for installation

Drill a hole for the pipework – recommended size 70-86mm dia. Use pipe sleeve (accessory) if required. Use Template Sheet to locate positions of suspension bolts. Bolt size M8 or M10. The refrigeration pipework can be routed right, left, top, or rear.

NOTE: the suspension brackets can be positioned facing inwards or outwards. Most of the bracket is concealed if facing inwards. See drawings on page 14 for positions of bolt fixings. Ensure suspension bolts are securely fixed into building structure, with a minimum resistive force of 50kg.



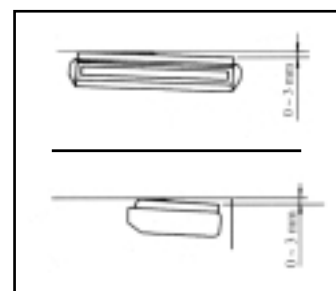
Fix suspension bolts (4 no. M8 or M10 – supplied by installer) into the building construction, in the required positions. With the hanging brackets secured to the suspension bolts, the unit (with side panels removed) can be lifted into position, onto the hooks of the brackets.



The fixing nuts secure the unit to the brackets. The side panels are replaced.

Attention must be paid to the level of the unit. There must be an incline of at least 3mm, to allow drainage of condensate from the drain tray.

For semi-recessed installation, a suitable size opening must be made in the ceiling. For a solid ceiling, e.g. plasterboard, it is necessary to make the opening wide enough to allow secure fixing. The space can be filled after installation is complete.



Condensate drain

The termination of the drain is a 'push-on' fitting, 20mm o.d. The condensate can be connected either at the right or left. Ensure there is adequate fall (min 1:50) of the condensate gravity drain. Use rigid drain piping. Please refer to CONDENSATE DRAINS INSTALLATION, page 23. The condensate drain must be insulated, to prevent external condensation.

Condensate pumps

A small kit pump can be fitted into the casing of the air conditioner if required. The sump/sensor unit should be carefully installed, ensuring it is lower than the exit connection of the condensate tray. Where the pump includes a 'fail safe' switch, the connection to stop the air conditioner can be made through the CnT port of the indoor PCB – terminals 1 & 6. The 'fail safe' switch must be voltage free. A connection adaptor, ref: F6001 is available free, from 3D, allowing easy connection to the CnT port. See p 21 for instructions.

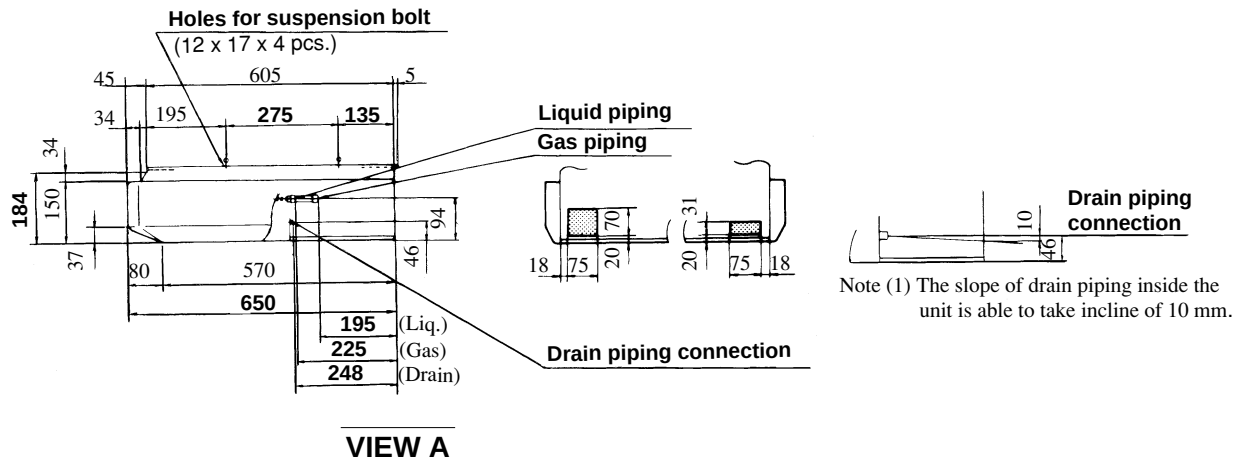
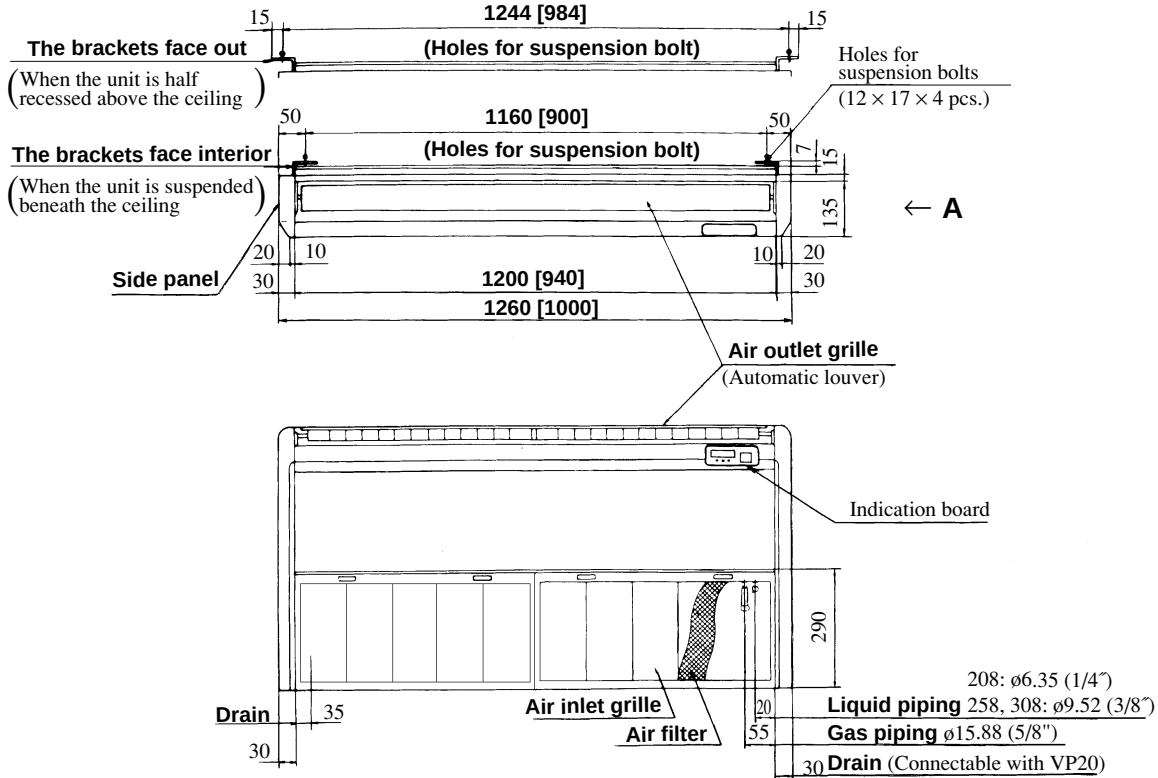
Electrical installation Please refer to page 21.

FDEN ceiling suspended 208, 258, 308, 408, 508

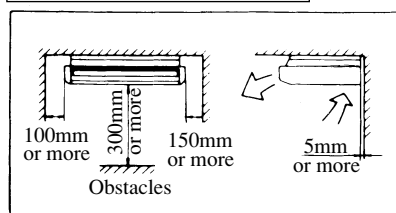
(1) Indoor unit

Models FDEN208H, 258H, 308H

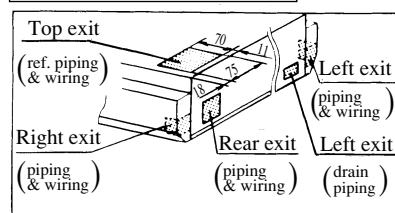
Unit: mm



Space for installation & servicing

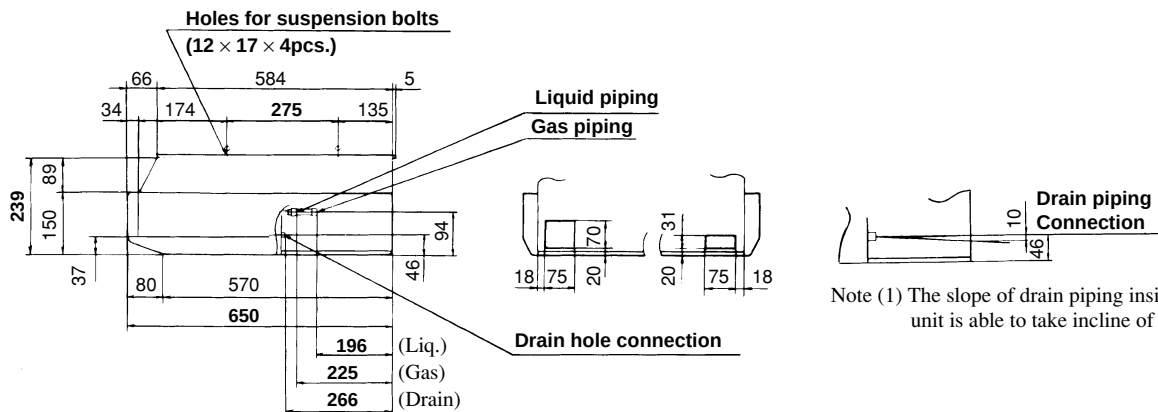
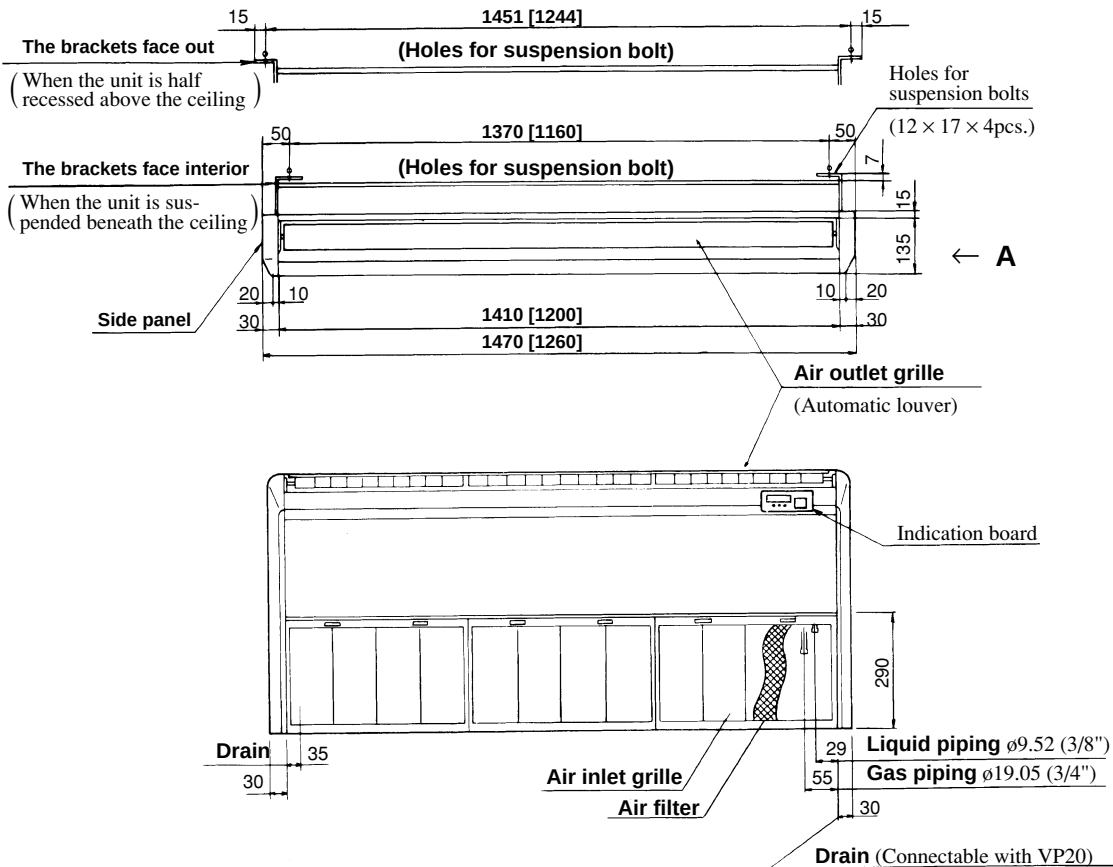


Piping & wiring draw out holes



Note (1) The [] value dimension for models FDEN208H.

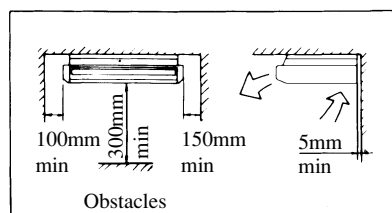
Models FDEN408H, 508H



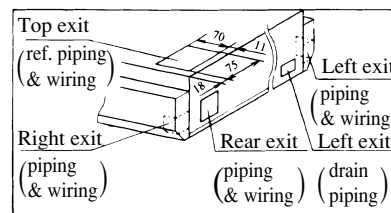
VIEW A

Space for installation & servicing

Ceiling suspension installation

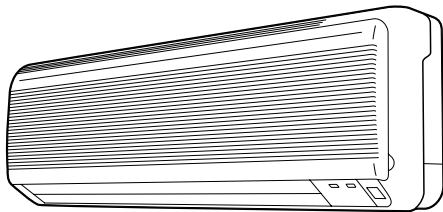


Piping & wiring draw out holes



Note (1) The [] value dimension for models FDEN408H





FDKN - 8 Series (*cassette*)

FDC - 6 & 8 Series (*outdoor*)

SYSTEM REFERENCE			2088	2588	3086	3086(3ph)	3088	3088(3ph)
PERFORMANCE								
Cooling performance nom.	(1)	KW	4.85	5.70	7.10	7.10	7.10	7.10
Cooling U K Conditions	(2)	KW	4.66	5.47	6.82	6.82	6.82	6.82
Sensible Cooling UK	(3)	KW	3.41	3.83	5.05	5.05	5.05	5.05
Heating Performance (HP only)		KW	5.40	6.10	7.30	7.30	8.00	8.00

ELECTRICAL DATA								
System Power connection			Mains to outdoor unit first. Interconnecting wiring - 3 wires + Earth, for cooling, 5 wires plus + Earth, for Heat Pump					
Run current - cooling	A		8.2	9.3	15.5	5.2/ph	13.8	5.4/ph
Start current max. L R A	A		44	51	89	43/ph	95	45/ph
Recommended Fuse Rating (Local)	(5)	A	20	30	30	15/ph	30	20/ph

INDOOR UNIT ref: FDT 8 Series		FDKN208	FDKN258	FDKN308	FDKN308	FDKN308	FDKN308
TECHNICAL DATA							
Dimension - Unit H x W x D	mm	275 x 790 x 179	298 x 940 x 196	298 x 1155 x 196			
Net Weight	kg	10	11	13.5	13.5	13.5	13.5
Fan Specification		Tangential Fan x 1					
Motor Rating	W	26 x 1	40 x 1	40 x 1	40 x 1	40 x1	40 x 1
Airflow (6) High / low speed	m ³/s	0.27 / 0.16	0.28 / 0.18	0.35 / 0.25	0.35 / 0.25	0.35 / 0.25	0.35 / 0.25
Sound Level at 1 m below/1m front - hi/lo	dBA	45 / 38	45 / 38	46 / 40	46 / 40	46 / 40	46 / 40
Safety Control		Internal thermostat for fan motor. Frost protection thermostat.					
Condensate Lift Pump – Max lift	mm	N/A					
Condensate Connection Size o.d.	mm	16	16	16	16	16	16
Fresh Air Inlet / Exhaust Air facility		N/A					
Refrigerant Control		Capillary tube.					
Pipe Termination Sizes o.d.	ins	5/8	5/8	5/8	5/8	5/8	5/8
o.d.	ins	1/4	3/8	3/8	3/8	3/8	3/8
Filter		Long life filter x 2 (Washable)		Long life filter x 3 (Washable)			
Remote Control (wireless infra-red)		Multi function hand held controller, supplied with wall bracket					

OUTDOOR UNIT ref: FDC 8		FDC208	FDC258	FDC306	FDC306(3ph)	FDC308	FDC308(3ph)
TECHNICAL DATA							
Dimension - Unit H x W x D	mm	690 x 880 x 290	845 x 880 x 340	844x 950 x 340		845 x 880 x 340	
Net Weight	kg	49	55	69		74	
Fan Specification		Propeller Fan x 1					
Motor Rating	W	55 x 1	55 x 1	60 x 1		55 x 1	
Sound level at 1 metre in front	dBA	52	52	56	56	52	52
Refrigerant type		R22 OR R407C (8 SERIES)					
Refrigerant factory charge R22 / R407C	kg	0.98 / 0.98	1.1 / 1.2	1.3/ N/A	1.3/ N/A	1.4 / 1.75	1.4 / 1.75

REFRIGERANT PIPING								
Pipe Termination Sizes o.d.	ins		5/8	5/8	5/8	5/8	3/4	3/4
	ins		1/4	3/8	3/8	3/8	3/8	3/8
Maximum pipe run	m		30	30	30	30	50	50
Max height diff. Outdoor unit above / below	m		15 / 15	15 / 15	15 / 15	15 / 15	30 / 15	30 / 15

- NOTES**
- Nominal cooling rated at ISO-A, JIS B8616 Outdoor: 35°C DB / 24°C WB Indoor: 27°C DB / 19°C WB
 - U K Cooling Outdoor: 30°C DB / 20°C WB Indoor: 23°C DB / 17°C WB
 - Sensible Cooling calculated at UK conditions, at standard air volume.
 - Heating Performance rated at: Outdoor 7°C DB / 6°C WB Indoor: 20°C DB
 - Recommendations are for supply to outdoor unit. Use motor rated fuse or MCB. Requirement may vary depending on site conditions.
 - CEN & HEN = 1ph CES & HES = 3ph.
 - Cooling only systems available in R22 models 2088 & 2588. Cooling only available with R22 FDC 6 Series outdoor units, and all R407C FDC 8 Series.



Installation of FDKN Wall Mounted Unit

Safety Warning: Refer to safety data on back cover of this manual

Application

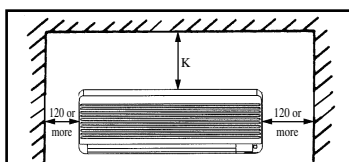
The unit is designed for most commercial applications, i.e. shops, offices, gyms, meeting rooms, bars, restaurants, etc. It should not be installed in an area contaminated by oil, chemicals, or an area with steam or excessive humidity, or hazardous substances, i.e. flammable gases, vapours, resins, thinners, petroleum, acids.

Do not install adjacent to equipment generating magnetic waves or high frequency signals, as the generated noise may cause equipment malfunction.

Unit location

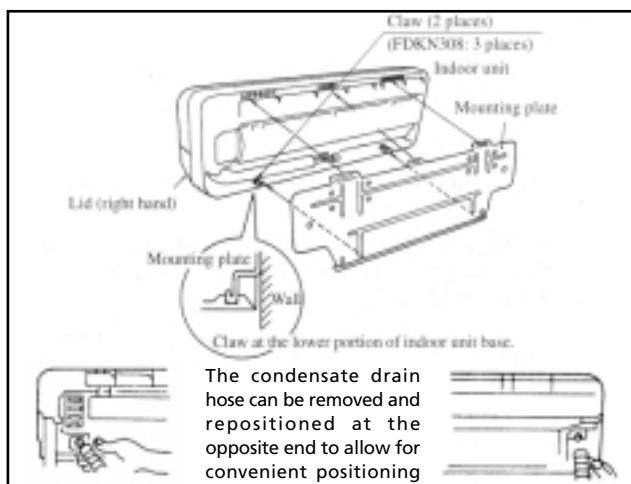
Select a suitable location within the room to allow optimum air distribution to all parts of the conditioned space. The minimum distance from a wall or obstruction is 120mm.

There must be sufficient clearance at the top (dimension 'K') to allow for the removal of the casing.



208 - K=65mm 258 - K=90mm 308 - K=90mm

The unit should be located so as not to cause draft disturbance to a person located directly in the path of the air discharge.



Further information

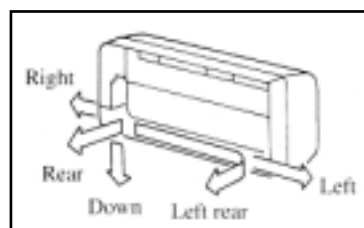
Remote control - wireless infra-red	page 18
Refrigerant piping installation	page 19
Outdoor unit installation and location	page 25
Electrical wiring installation	page 21

Preparation for installation

Unpack the unit, taking care not to damage the fascia. Remove the wall mounting plate and screw to the wall, ensuring secure fixing to wall structure. Fix one screw first, and then use a spirit level to locate the mounting plate horizontally, marking the remaining fixing holes on the wall, and fix with screws as required.

Connection and routing of pipework

The refrigeration pipework is terminated as two copper tubes, with flared fittings. The tubes can be bent, and routed out of the unit at 5 alternative positions, as shown.



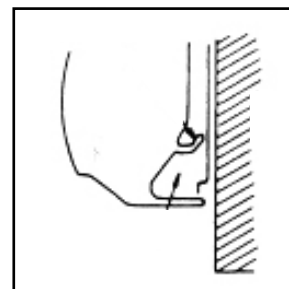
The pipes should be bent in the direction required, prior to the unit being installed.

Condensate hose

The flexible drain hose is located at the bottom rear of the unit, and can be attached to either the left or right connections to the drain tray. The spring clip securing the hose can be easily removed. The drain stub cap must be fitted to the stub, in place of the hose. The hose should exit the unit with the refrigeration pipework, ensuring a sufficient inclination away from the unit – min gradient 1:50.

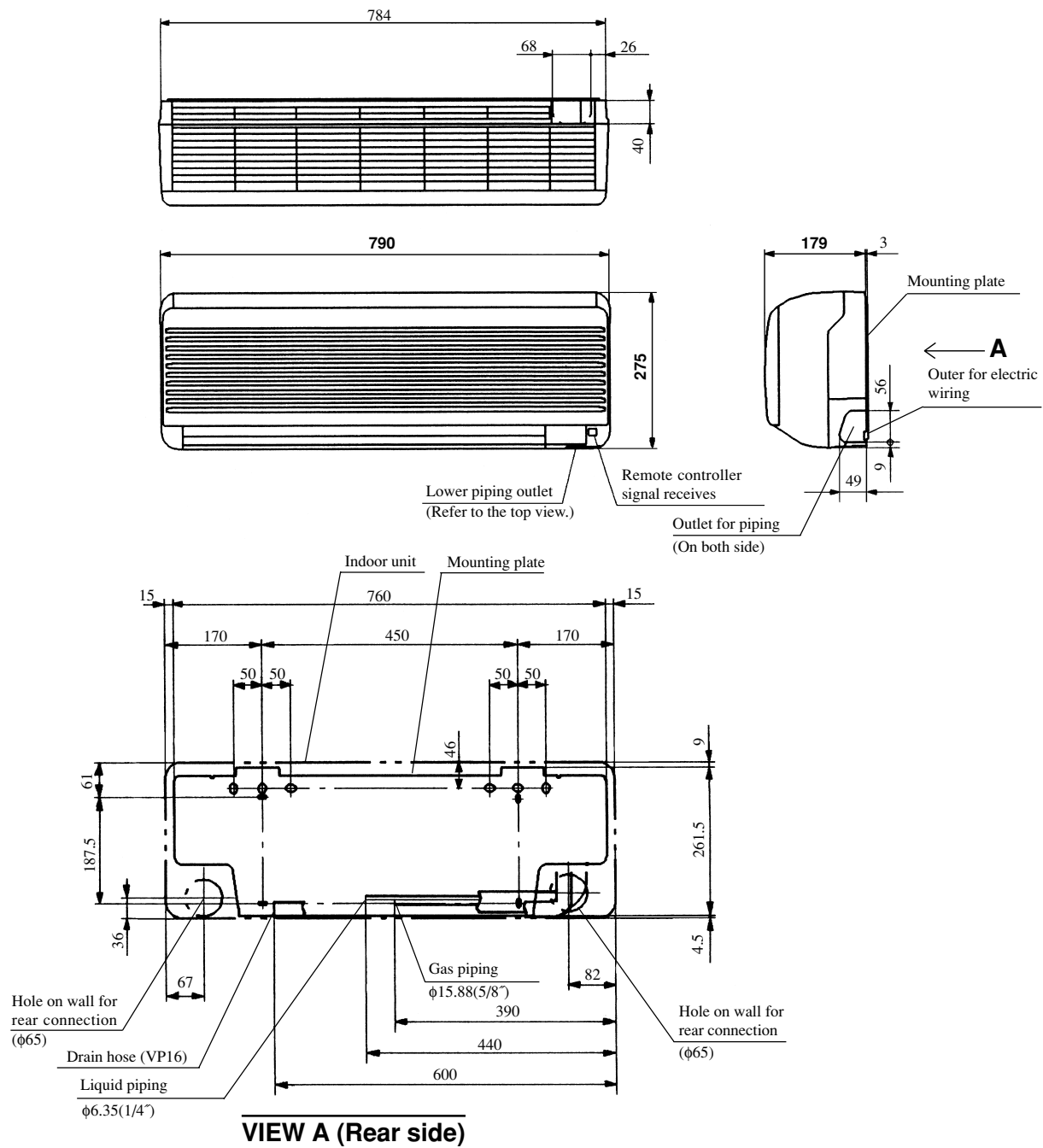
Condensate pump

If an internal kit type condensate pump is used, it may be easier to remove the drain hose and to use a short cut length of insulated hose to the sump/sensor component of the pump. The drain stub on the condensate tray is 13mm o.d. Note: condensate pump to be supplied by the installer. The installer must make provision for access to the condensate pump for cleaning and servicing.

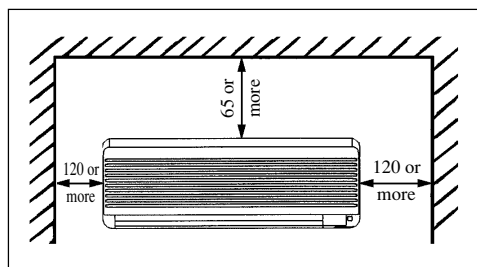


FDKN - 8 Series (wall mounted)

(1) Indoor unit Model FDKN208H

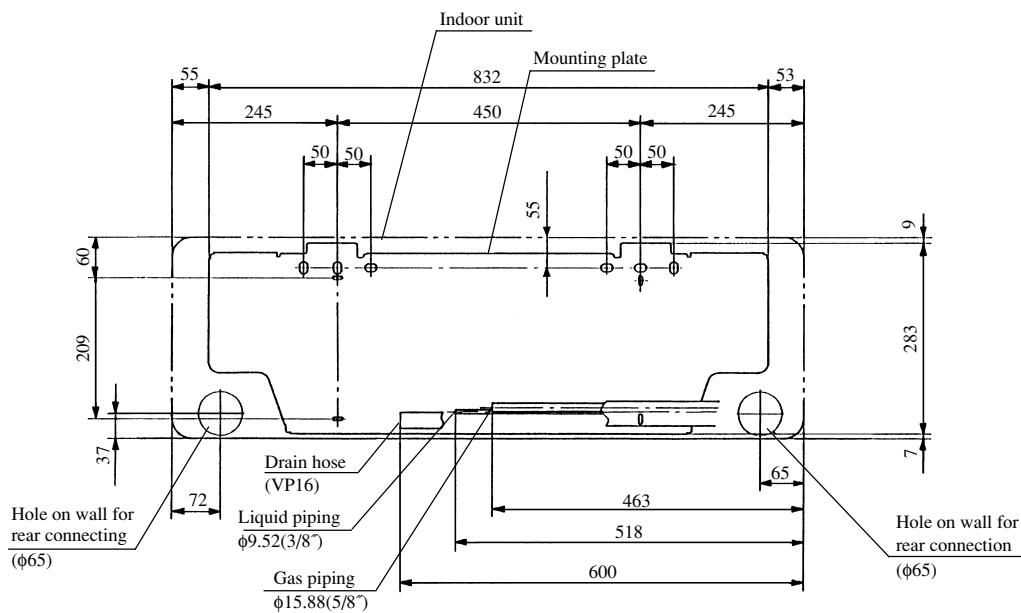
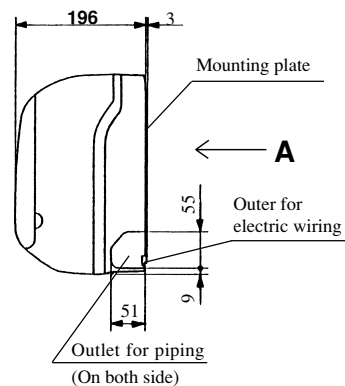
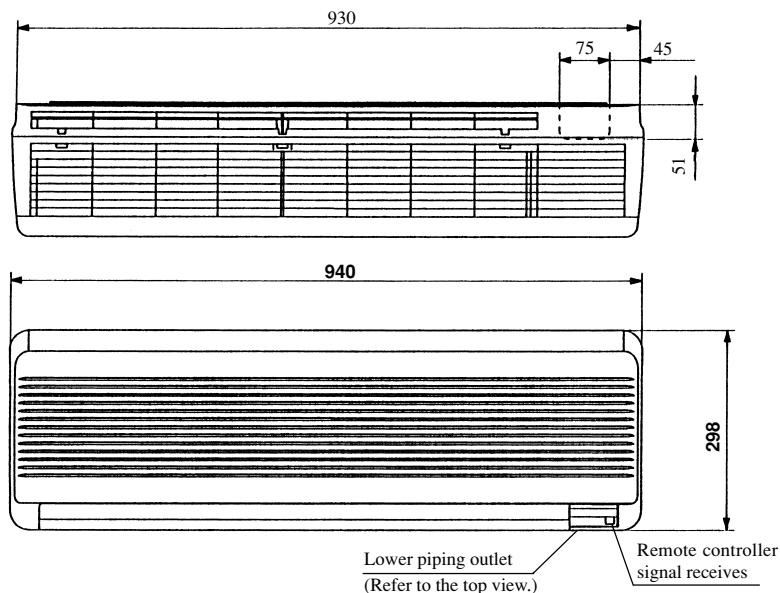


Space for installation and service



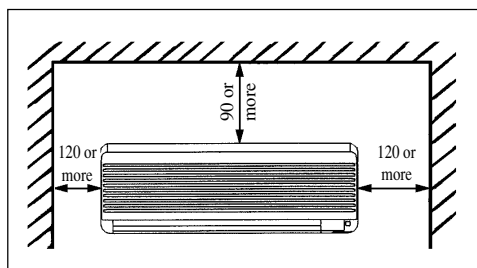
Model FDKN258H

Dimensions in mm

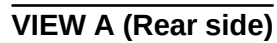


VIEW A (Rear side)

Space for installation and service



Dimensions in mm

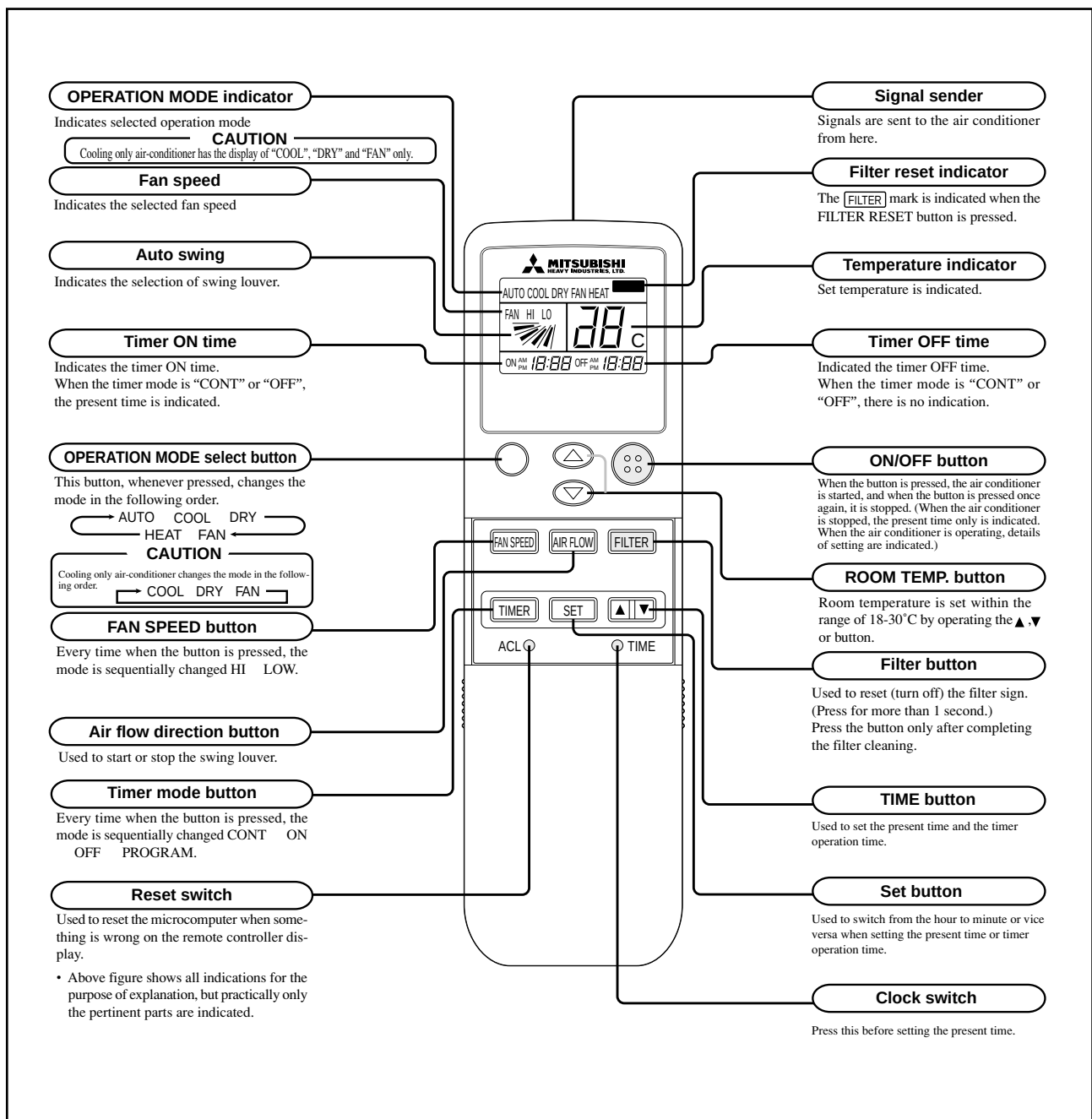


Remote control *(wireless Infra-red)*

Indoor units with wireless control

All units with the designation 'N' in the product code, are controlled by a hand held 'wireless' remote control, e.g. FDEN (ceiling), FDKN (wall), and FDTN(cassette). The controller is supplied with a wall mounting bracket.

The receiver on the indoor unit must be kept clear of obstructions. The controller will operate in most situations at a distance of up to 3 metres. This distance may be reduced if there is interference, e.g. from high intensity lighting.



Refrigeration pipework

Skill requirements

All interconnecting refrigeration pipework must be installed, tested and commissioned by a specialist refrigeration contractor, who should provide for each operator, Certificates of Competence regarding the Brazing of Refrigeration Copper Pipework, and the Safe Handling of Refrigerants.

Material

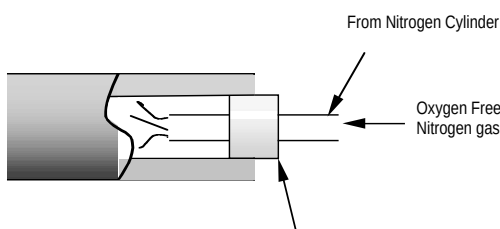
Only refrigeration quality seamless copper pipe must be used. This must conform to the requirements of BS2871 – Part 2, being of suitable quality for use with refrigerants. Full details of maximum allowable pressures for pipework and fittings are detailed in 'The Engineers Guide' published by 3D Air Sales Ltd.

Pipework site management

To minimise the number of joints, coiled copper should be used in preference to straight lengths. Brazed joints should be used in preference to flared joints. All pipework must be square cut using a propriety pipe cutter to give a clean cut, without copper fragmentation. Hacksaws must not be used. Tubes must be capped to avoid ingress of moisture and dirt.

Brazed joints

When brazing all pipework must be purged with nitrogen (low pressure oxygen-free), providing positive pressure in the pipe, preventing the formation of copper oxide particles and scale. An annulus must be used between the feed pipe and the refrigerant pipe, to eliminate the ingress of air, at the point of entry. The formation of scale and particles will result in valves and capillaries becoming blocked. Particles entering the compressor may cause a reaction with the refrigerant oil, resulting in acidic decomposition of the compressor motor windings.



Annulus between o.d. of nitrogen pipe and internal dia of refrigerant pipe, sealed with rubber plug or similar. This is to ensure complete purge of air from refrigerant pipework. Set nitrogen flow meter to 0.05m³/hr, OR (if no flow meter) set pressure reducing valve to 0.2 Bar.



Pipework support

Copper pipework must be supported correctly, by suitable clamps, or in perforated cable tray. Where clamps are used, the pipework must be supported at the maximum centres stated below:

FIXING CENTRES - SOFT TEMPERED COPPER TUBE

o.d. "	1/4	3/8	1/2	5/8	3/4	7/8
HORIZONTAL	0.8	1.0	1.2	1.2	1.5	1.5
VERTICAL	1.0	1.2	1.5	1.5	1.5	1.8

FIXING CENTRES - HALF HARD COPPER TUBE

o.d. "	1/4	3/8	1/2	5/8	3/4	7/8	1 1/8
HORIZONTAL	0.8	1.0	1.2	1.2	1.5	1.5	1.5
VERTICAL	1.0	1.2	1.5	1.5	1.5	1.8	1.8

Pipe sizes

It is essential to use the pipe diameters stated in the Engineering Data tables relevant to each system. The stated sizes must be used for all pipe lengths up to the maximum length.

Traps

Do not use traps anywhere in the refrigeration pipework.

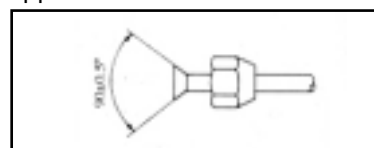
Maximum pipe length

Do not exceed the maximum length and vertical separation between the indoor and outdoor units, as stated in the specification data table.

Flared joints and pipe bends

Place the flare nut on the tube prior to flaring. Use a good quality proprietary flaring tool. Lubricate the tool and the copper pipe with refrigerant prior to flaring. Inspect the flared copper carefully, ensuring there are no cracks or flaws in the copper.

Position the pipe and flare nut, and tighten to the following limits:



TUBE DIA (o.d. in)	1/4	3/8	1/2	5/8	3/4	7/8
TORQUE kg/m						
min	1.6	4.0	4.0	9.0	10.0	12.0
max	2.0	5.0	5.0	12.0	14.0	16.0

Pressure testing

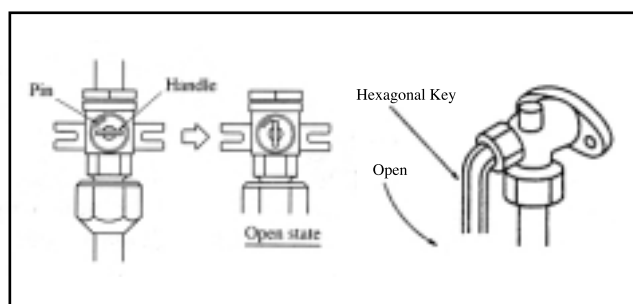
Ensure that outdoor unit service valves remain closed for pressure testing. Perform pressure test with dry nitrogen, up to 15bar. Inspect all joints for leakage. Check for any deviation in pressure.

Refrigerant charging

Low ambient control

Vacuum pump

NOTE: All equipment used on R22 systems must be kept separate from equipment used on R407C systems. With the outdoor unit service valves closed, the pipework and indoor unit must be evacuated, using a suitable vacuum pump. See diagram below regarding service valves. This is to ensure all air, moisture and other gases are completely removed from the system, and to confirm the leakage testing. A vacuum of -75cmHg should be applied for at least two hours.



Refrigerant charging

It is essential that the correct amount of additional refrigerant is added to the system, before the system is switched on. The length of refrigerant piping (one way) must be measured to the nearest metre, and the additional charge added, as detailed in the installation instructions packed with the unit.

Electronic weighing scales

Do not attempt to add refrigerant charge unless electronic scales are used.

Insulation

All refrigerant pipework, both liquid and gas pipes, must be insulated, and insulation joints sealed.

The insulation material must be pre-formed Armaflex, or similar, Class "O" fire rated, and vapour sealed. The wall thickness should be at least 6mm for copper pipe diameter of $1/4"$, and 13mm for all larger sizes.

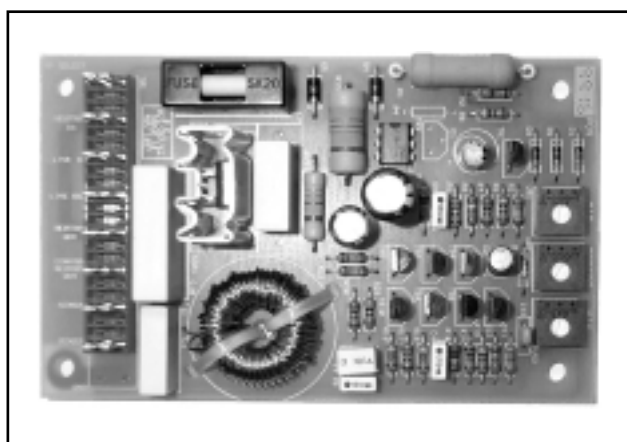
IMPORTANT

Manifolds and tubes for R22 systems must be kept separate from those used on R407C systems.

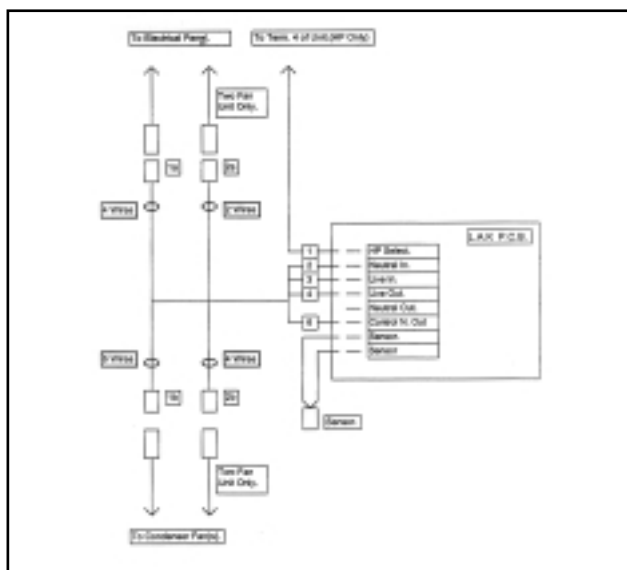
Low ambient control Ref: L1220 (For FDC 6 Series OUTDOOR UNITS)

Application

The FDC 6 Series outdoor units are designed to operate, in the cooling mode, in ambient temperatures down to 10°C . Below this temperature it is likely that over condensing will occur, and the internal cooling performance will be affected.



The low ambient kit reduces the condenser fan speed, to prevent over condensing, and to maintain the refrigerant pressure in the system at a level which will maintain its cooling performance. The low ambient control is temperature actuated, with a small thermistor fitted to the copper tubing of the condenser coil.



Electrical site wiring - must be installed only by qualified personnel

Safety Warning: Refer to safety data on back cover of this manual

Power supply wiring

The system designation will indicate the requirement for either 1ph or 3 ph supply, to the outdoor unit e.g.

Ref: HEN = 1 phase L + N + E

Ref: HES = 3 phase L1 + L2 + L3 + N + E.

The system power is connected to the outdoor unit first. All indoor units have 1 phase connection, taken from the outdoor unit terminal block.

Wiring specification must be selected and installed in accordance with IEE regulations, and with site requirements.

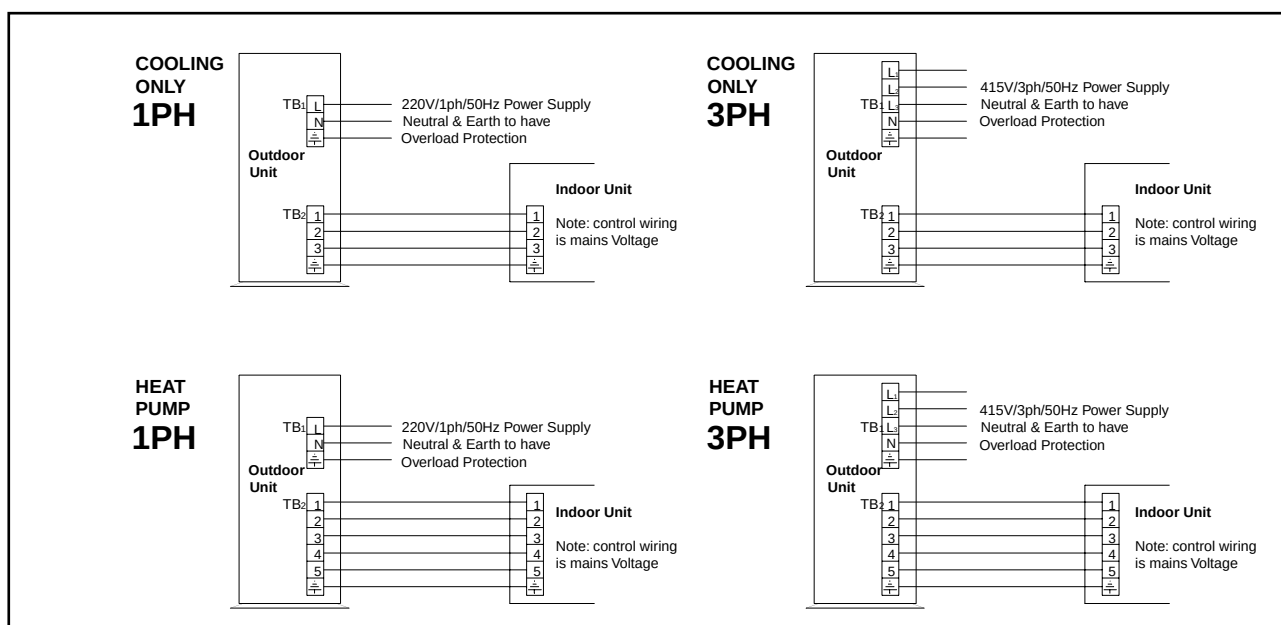
Recommended MCB or fuse rating

Please refer to unit technical data for recommended sizes. These recommendations are for guidance only, and may vary depending on site conditions.

Interconnecting wiring

Connect the wiring to the same number terminal on indoor and outdoor units, as shown on the diagram below. The wiring must be secured so that the terminals are not tensioned if force is applied to the wiring.

IMPORTANT Do not run the unit until the required amount of refrigerant is added to the system, and the outdoor unit shut-off valves are in the open position. When power is connected, the system will operate immediately.



Isolator for indoor unit power connection

The wiring connections to the indoor unit should be via a fused isolator rated at 5A.

Time Clock, Remote Switch, and BMS Connection

FD Series indoor units are provided with a 6 terminal socket marked CnT. Connection to this port allows remote switching, operation functions, and fault indication.

Terminal 1 is a 12V output. Terminal 6 can be connected via a volt free switch or relay to terminal 1 to turn the unit on/off.

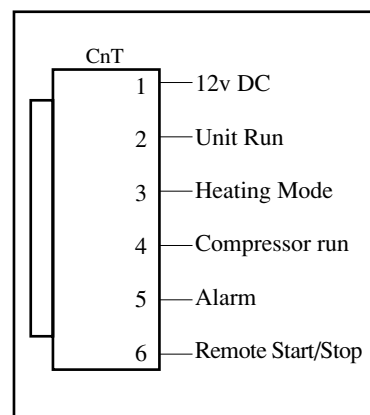
Additional volt free relays are required for the remaining output signals. Terminals 2,3,4,5 are switched NEGATIVE, i.e. the voltage will drop from 12V to ZERO when actuated.

6-Way adaptor connection

The 6-way adaptor is available from 3D (ref: F6001) allowing easy wiring connection to the CnT terminal socket.

Consideration must be given to voltage drop if the 12V control cables are more than 15m in length. Recommended relays - Supplier RS Components

Relay part ref: 366-259
Relay base part ref: 350-456



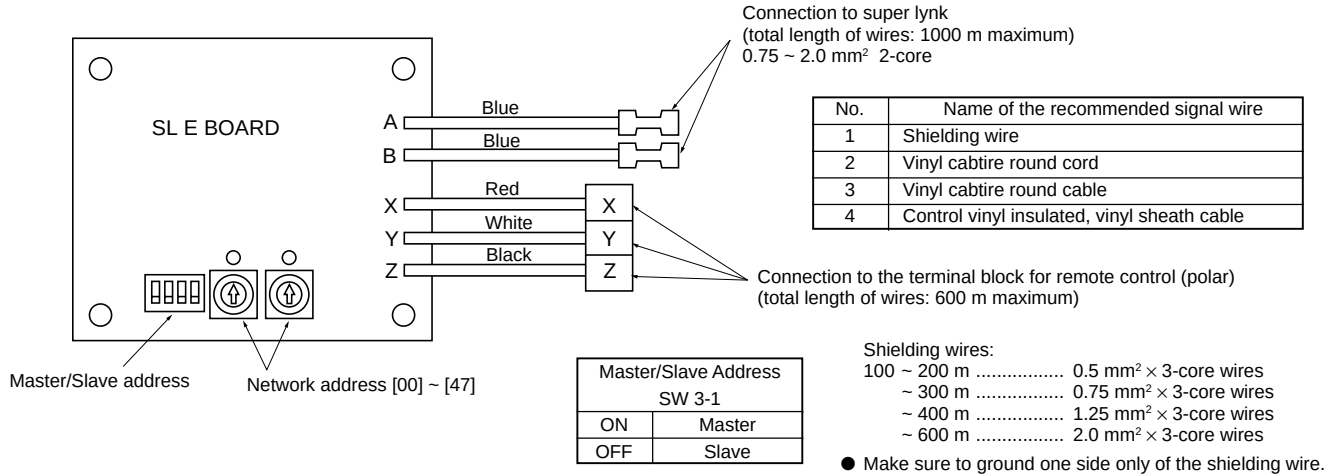
Superlynk Connection - FD Series Split Systems

This board is used when conducting control of the single package (wired remote controller unit) 8-type series using a Super lynk option (SLA-1-E, SLA-2A-E, etc).

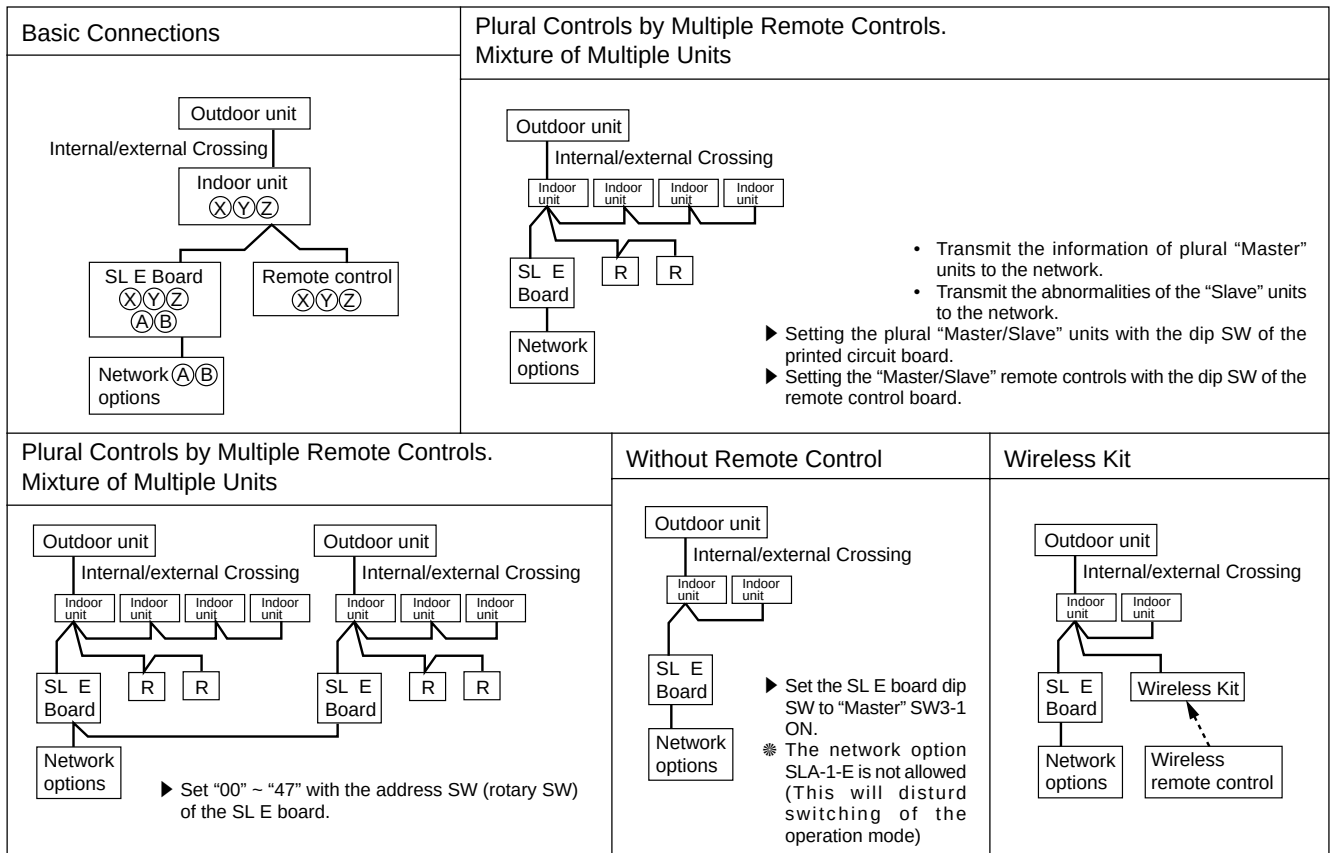
(1) Functions

- Transmits the settings from the Super lynk option to the indoor units.
- Returns the priority indoor unit data in response to a data request from the Super lynk option.
- Inspects the error status of connected indoor units and transmits the inspection codes to the Super lynk option.
- A maximum of 16 units can be controlled (if in the same operation mode).

(2) Wiring connection diagram



- Set the super lynk network address with SW1 (10-position) and SW2 (1-position).
- Without a remote control (no wired remote control and no wireless remote control), set SL E board SW3-1 to ON (Master).



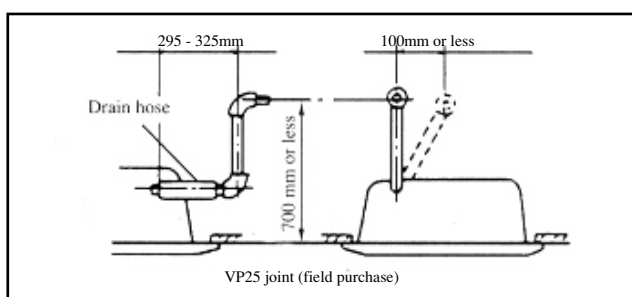
Installation & recommendations - Condensate Drains

Condensate lift pumps

Lift pumps are included on FDT cassette, and FDR ducted cassette. Please refer to the maximum allowable lift for the relevant pumps. Condensate pumps are also included on the KX Inverter Multi systems –models: FDT cassette, FDR ducted cassette, FDTs single discharge cassette, FDTW 2-way cassette, and FDUM horizontal ducted unit.

Condensate piping

For units which include a condensate pump, it is important to install the vertical section within the limitations detailed.



Where there is sufficient height within the ceiling void, the pump can be utilised to raise the condensate water to a height sufficient to ensure a positive downward gradient to a gravity drain. This eliminates the requirement for a secondary condensate disposal pump.

For units with a lift pump, it is essential the first horizontal section and vertical lift are installed within the limitations indicated in the piping diagram. This is to prevent too much water being contained in the vertical lift, which would flood back to the unit and overflow, when the power is switched off.

Pipe termination - FDT & FDR

The pipe termination is of rigid polythene 25mm o.d. FDT cassette and FDR ducted units include an insulated flexible connection sleeve, complete with a securing clip, which terminates to 25mm i.d., 32mm o.d.

Termination sizes for FDEN, FDKN & FDU

FDEN termination 20mm o.d.

FDKN termination 16mm o.d.

The above are flexible hoses with serrated push on fitting.

FDU termination 32mm i.d. flexible

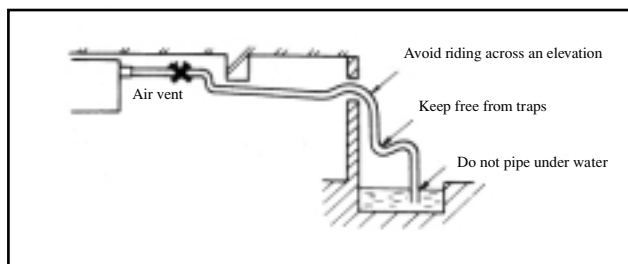
Gravity drain

The condensate gravity drain must be rigid heavy duty PVC to BS3505 Class E. Alternatively, copper drain piping can be used, which should be to BS2871 Part 1 Table-Y. This should be connected in a similar way to the rigid gravity drain piping. Care must be taken not to damage or dislodge the pipe outlet from the unit.

The drain pipe must be inclined away from the unit at a downward gradient of at least 1 in 50. Traps must not be fitted (except for FDU – see note below). It may be necessary to provide rodding access for cleaning purposes, for a long condensate drain run.

Pipe insulation must be fitted if there is a possibility of condensation forming on the outer surface of the drain piping, or the connection fitting.

Avoid positioning the drain termination where unpleasant odours, or gases, may enter the pipe, and subsequently enter the conditioned space.



1. Do not provide air vent in the condensate drain.
2. Do not allow upward elevation.
3. Do not trap.
4. Do not terminate the drain where it can become submersed.
5. Provide adequate support to condensate pipework to avoid sagging.



Installation & recommendations - Condensate Drains

Common drain piping

Where a common drain is to be provided for several units, ensure that discharge water from one unit is prevented from entering another unit. The common drain must be installed below the pumped drain lift of all units.

The common drain piping should be larger diameter, minimum 28mm i.d.

Drain testing

For units with condensate pumps fitted, the electrical supply will need to be connected, and the unit switched on in cooling mode. Supply approximately 1000cc of clean water, using a water feed pump, into the drain tray, through one of the air discharge outlets (with fascia panel removed).

Check all joints for leakage, and check sound of lift pump operating (where fitted). If residual water is required to be removed, this can be done by removing the drain plug.

For units without a condensate lift pump, the drain piping must be tested in a similar way to the above.

Installation of - FDC Outdoor Units

Warning: Units with CES or HES designation have electrical terminals 380v 3 Phase

Application

The outdoor unit is designed to operate in normal outside environments. It should not be installed in an area contaminated by oil, chemicals, or an area with steam or excessive humidity, or close to salt water in a seaside location, or hazardous substances, i.e. flammable gases, vapors, resins, thinners, petroleum, acids.

Do not install adjacent to equipment generating magnetic waves or high frequency signals, as the generated noise may cause equipment malfunction.

Construction

The FDC outdoor units are of robust construction, with panels manufactured from galvanised sheet steel with powder paint coated finish. The air is drawn through the heat exchanger, and discharged horizontally by large diameter fan(s), (two fans on 406/506 & 408/508).

Mounting feet are fixed to the bottom plate, which must be used to securely fix the unit. Removable panels allow access to the electric enclosure, and internal components. Pipe terminations are exposed on FDC 6 Series, and are enclosed on FDC 8 Series, (see diagram for routing of refrigerant pipework).

Outdoor unit location

Select a suitable location outside the building, as near as possible to the indoor unit, avoiding long pipe runs.

Ensure that the building structure is capable of supporting the weight of the installed equipment, and that vibration transmission through the structure will not cause a disturbance. Make provision for excessive forces of prevailing winds, and site personnel climbing onto units. Warning signs should be fixed where appropriate.

Do not install the outdoor units where there is a possibility of causing a noise disturbance to adjacent buildings, in particular if equipment is expected to operate at night time within a residential area.

The outdoor units are not suitable for installation close to the sea, as the salt laden air will cause damage to the heat exchangers. The units should not be installed in environments where the atmosphere is contaminated, e.g. chemical processes, engineering workshops, or areas where there is a high level of electronic noise.

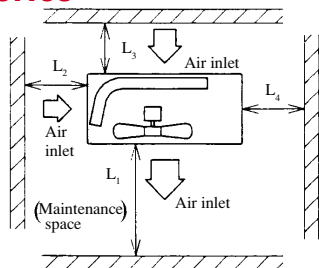
Minimum space for installation

The outdoor unit air flow must not be restricted. The unit must not be installed in a confined space, allow at least 1m clear above the unit. Do not install close to a movement of hot air, or inside a building or roof space, where it is not possible for hot air to escape.

Where several units are installed, ensure the air intake is clear of another unit's discharge air.

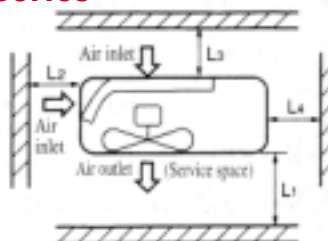
Minimum space for installation & maintenance

FDC 6 Series



Model	FDC206, 256			FDC306			FDC406, 506		
	Case I	II	III	I	II	III	I	II	III
Distance									
L1	open	100	open	open	open	500	open	open	500
L2	100	open	300	0	open	300	0	open	open
L3	100	500	100	150	100	150	300	150	150

FDC 8 Series



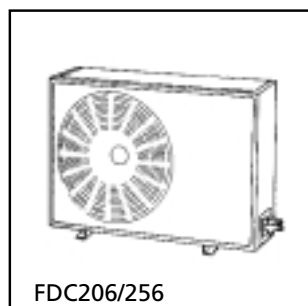
Installation example	FDC206, 256			FDC306			FDC406, 506		
	I	II	III	I	II	III	I	II	III
Distance									
L1	Open space	Open space	800	Open space	Open space	800	Open space	Open space	500
L2	300	5	Open space	300	5	Open space	300	5	Open space
L3	100	150	100	100	150	100	150	300	150
L4	5	5	5	5	5	5	5	5	5



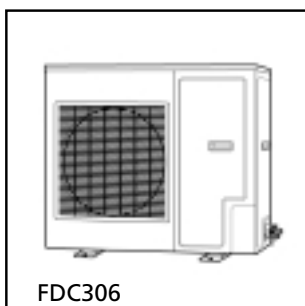
Safety Warning: Refer to safety data on back cover of this manual

FDC 6 Series outdoor units

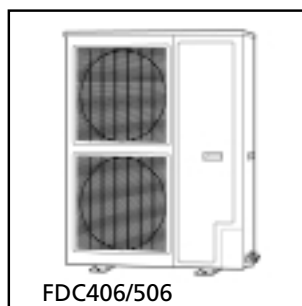
All units have 'draw through' air flow. Pipe connections/service valves are external to the unit, at bottom right hand side. All units are fully weatherproof.



FDC206/256



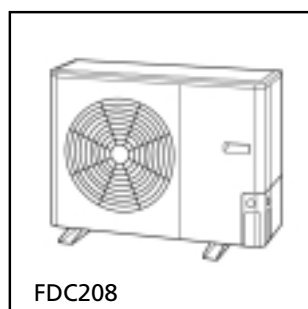
FDC306



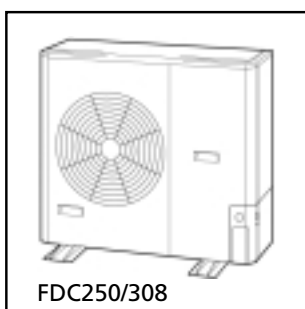
FDC406/506

FDC 8 Series outdoor units

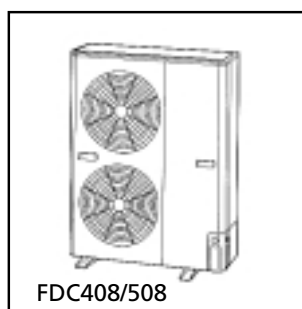
All units have 'draw through' air flow. Pipe connections/service valves are allowing pipes to enter at side, front, bottom or rear. All units are fully weatherproof.



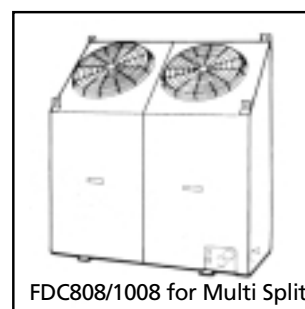
FDC208



FDC250/308



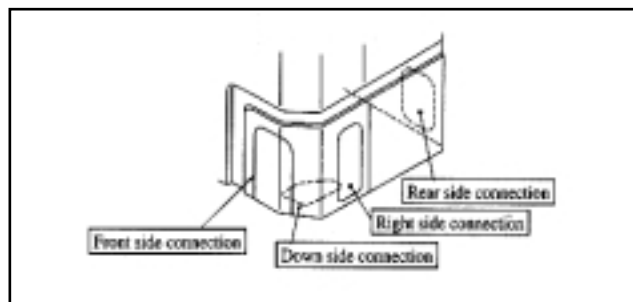
FDC408/508



FDC808/1008 for Multi Split

Refrigeration pipework

The pipework connections are inside the FDC unit. This allows the pipes to exit from four different directions – see below.



Refrigeration pipe sizes

It is essential that refrigeration pipe sizes are exactly as those stated in the Product Data Tables.

- Do not deviate from the recommended pipe sizes.
- Do not exceed the maximum lengths.
- Do not exceed the maximum vertical separation.

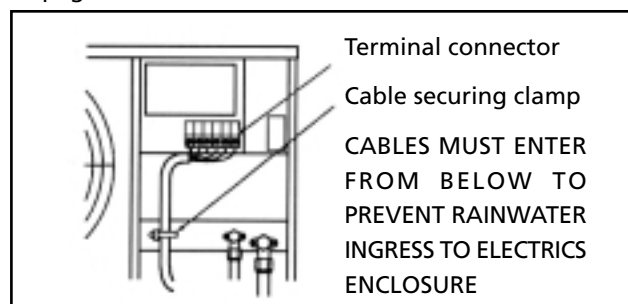
Condensate drainage

Heat pump outdoor units will produce condensate water. Ensure condensate water is able to drain effectively from

the unit. Raise the unit from the ground if necessary, to ensure water does not enter the bottom of the unit. Take necessary precautions to ensure condensate water does not cause a freezing hazard in winter conditions.

Electrical connection

Ensure power cables are secure. Do not allow power cables to pull on the electrical terminal connectors. Refer to page 21 for details of electrical connections.

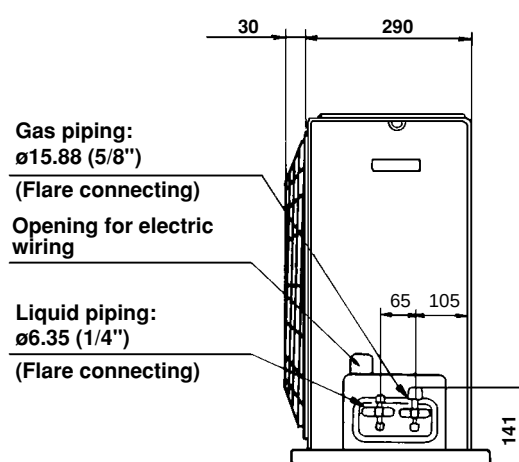
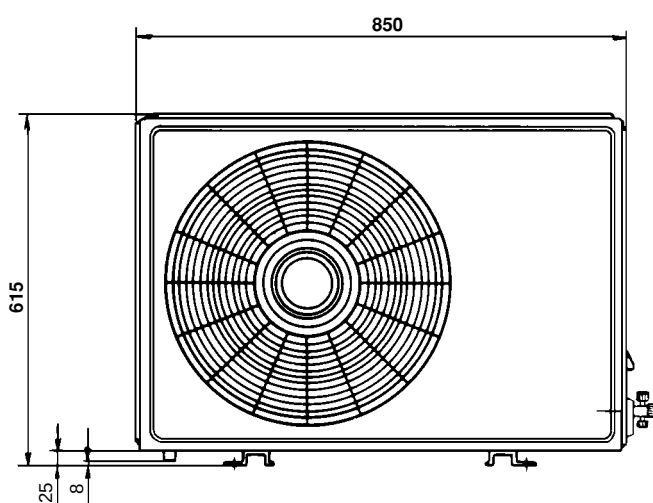
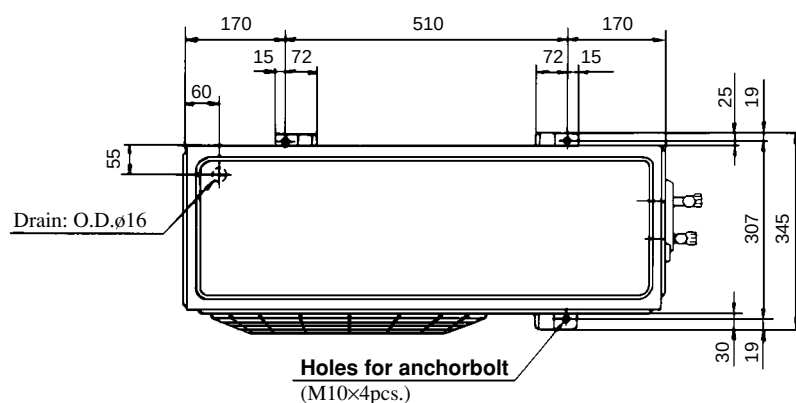


IMPORTANT

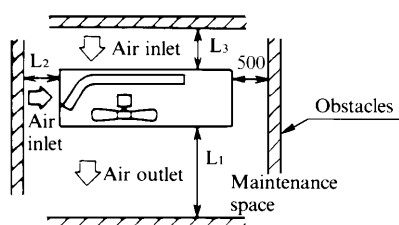
Do not run the unit until the required amount of refrigerant is added to the system, and the outdoor unit shut-off valves are in the open position. When power is connected, the system will operate immediately.

Models FDC206HEN3, 206HEP3, 256HEN3, 256HEP3

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit: mm

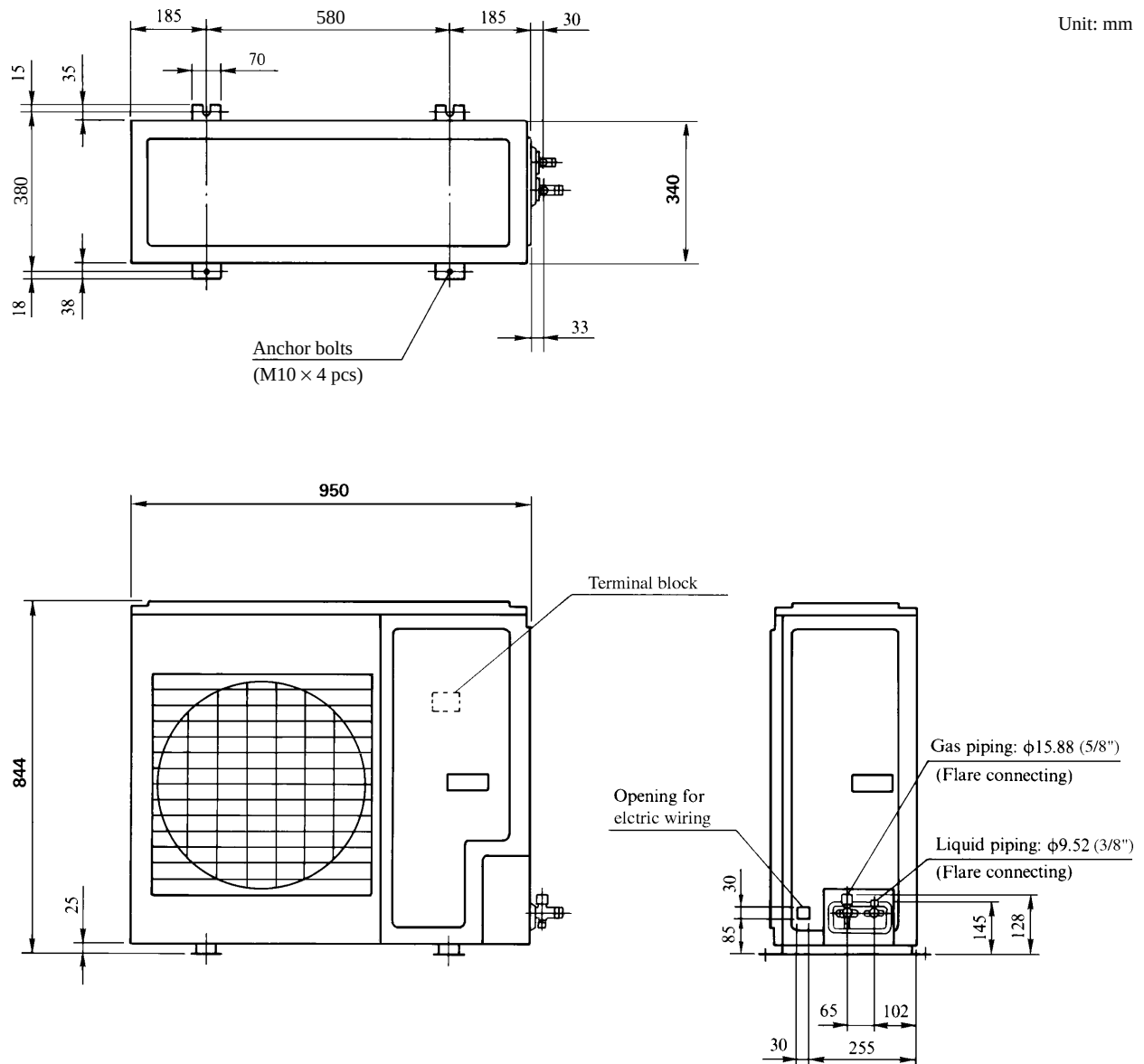
Mark	Installation type	
	I	II
L ₁	Open	100
L ₂	100	Open
L ₃	100	500

Notes

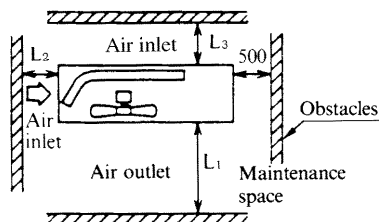
- (1) Fix the unit with anchor bolts.
- (2) Strong wind must not be directed to the air outlet.
- (3) Free space over the unit must be larger than 1 m.
- (4) The unit should not be surrounded by obstructions in all direction. At least one direction around the unit must be free.

Models FDC306HEN3, 306HEP3, 306HES3

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

Mark	Installation type		
	I	II	III
L ₁	Open	Open	500
L ₂	300	0	Open
L ₃	100	150	100

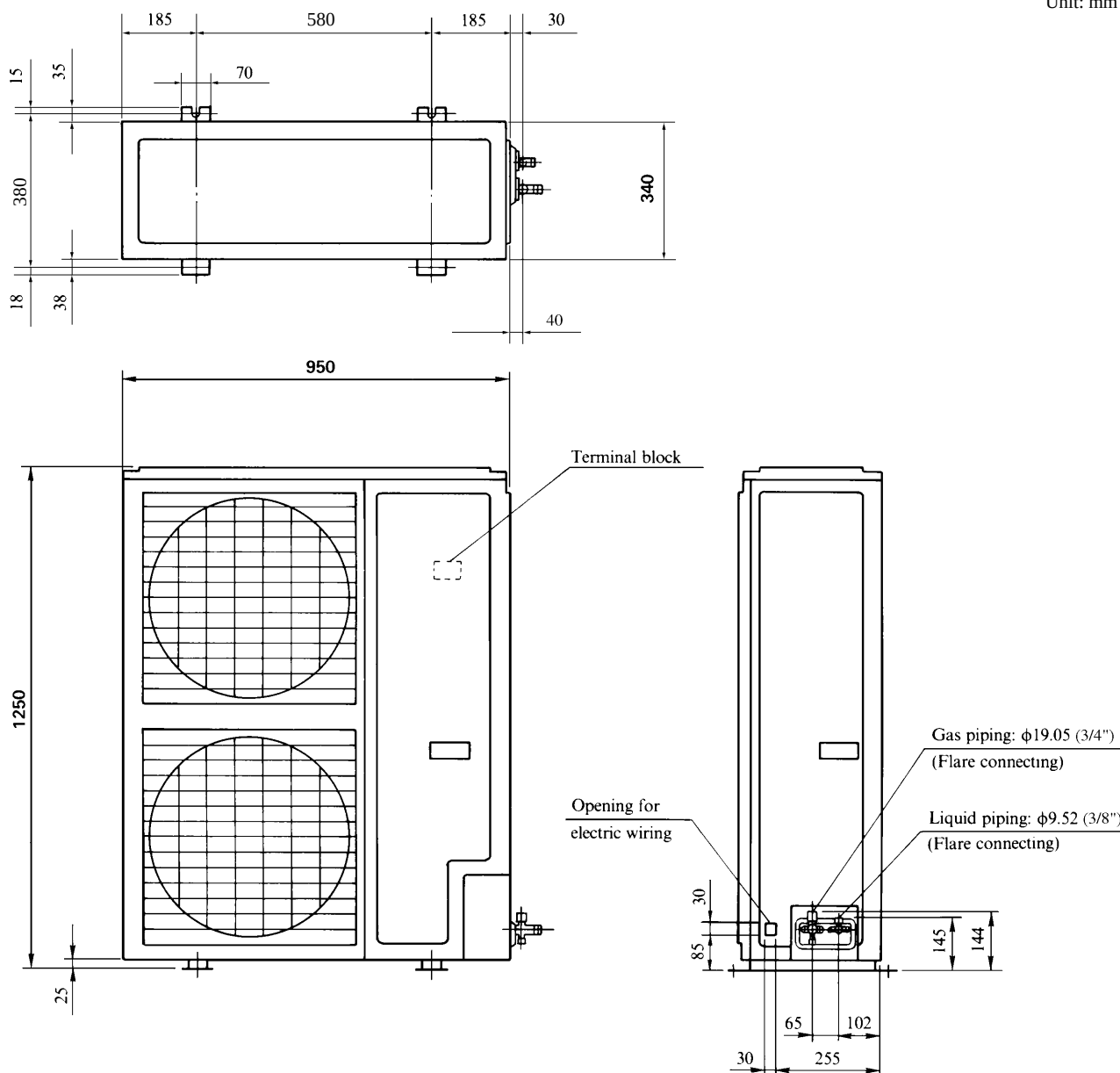
Notes

- (1) Fix the unit with anchor bolts.
- (2) Strong wind must not be directed to the air outlet.
- (3) Free space over the unit must be larger than 1 m.
- (4) The unit should not be surrounded by obstructions in all direction. At least one direction around the unit must be free.

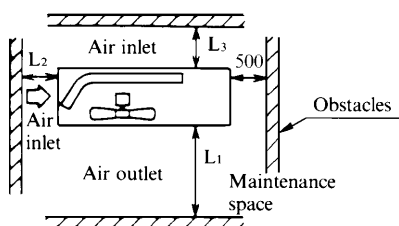


Models FDC406HES3, 506HES3, 506HEM3

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

Mark	Installation type		
	I	II	III
L ₁	Open	Open	500
L ₂	300	0	Open
L ₃	150	300	150

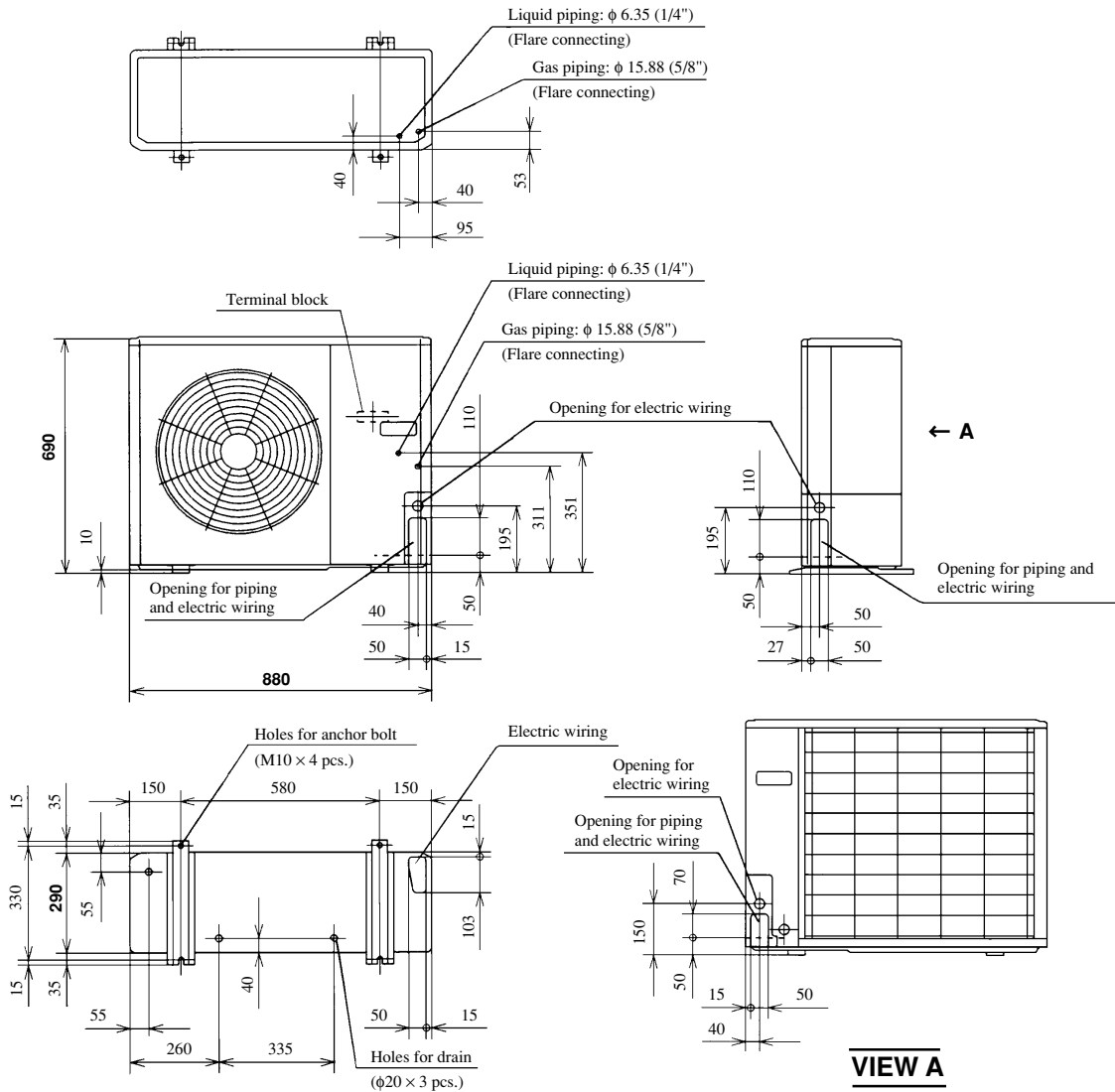
Notes

- (1) Fix the unit with anchor bolts.
- (2) Strong wind must not be directed to the air outlet.
- (3) Free space over the unit must be larger than 1 m.
- (4) The unit should not be surrounded by obstructions in all direction. At least one direction around the unit must be free.

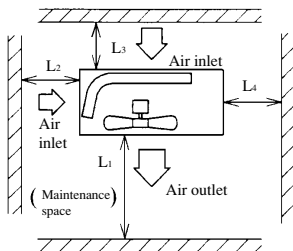
Outdoor unit

Models **FDC208HEN3A**
FDCP208HEN3A

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit: mm

Mark	Installation type	Unit: mm		
		I	II	III
L ₁		Open	Open	500
L ₂		300	5	Open
L ₃		100	150	100
L ₄		5	5	5

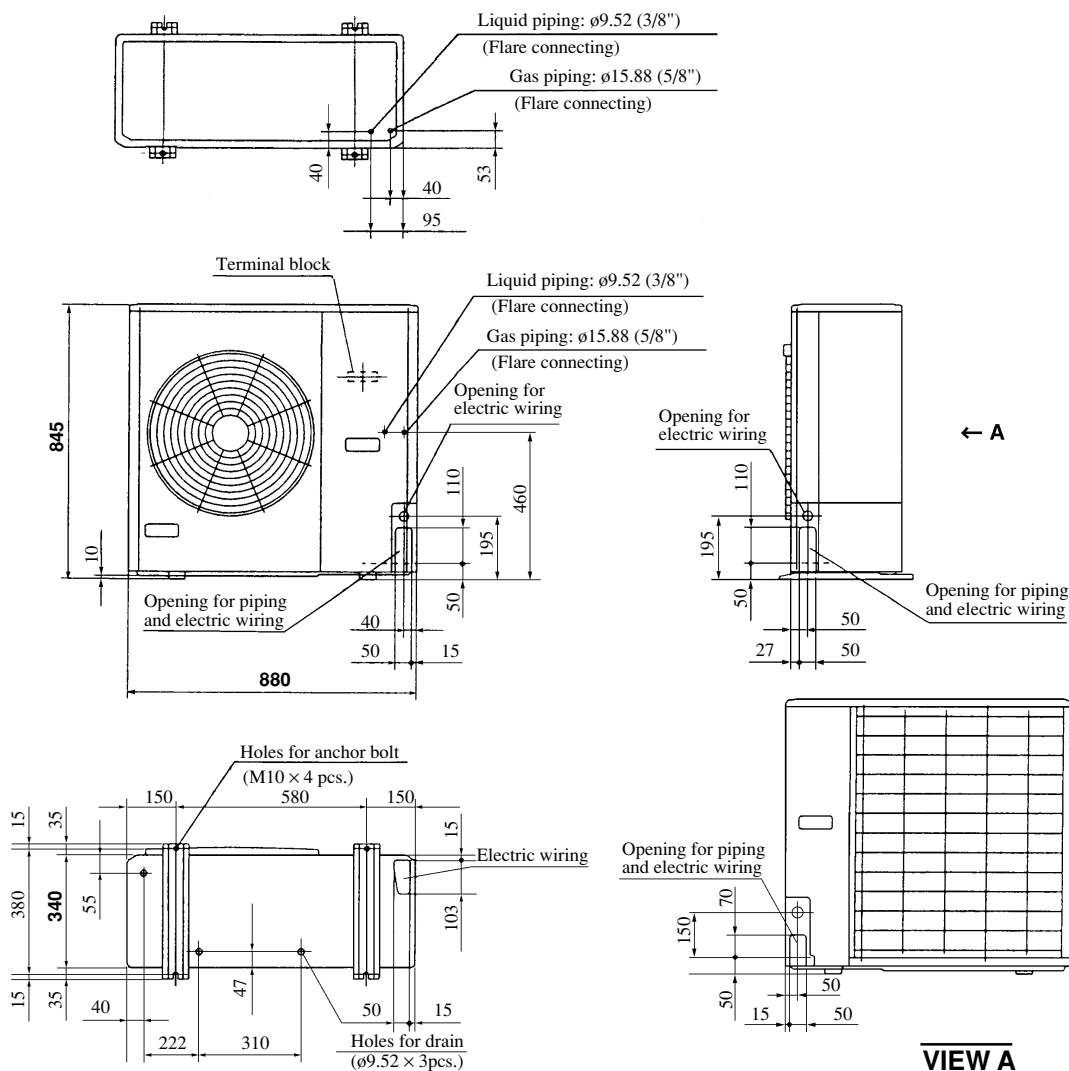
Notes

- (1) Avoid the location where four sides are entirely surrounded by walls.
- (2) Fix the unit by anchor bolts without fail. Restrict the protrusion length of anchor bolt to 15 mm and under.
- (3) When strong wind blows against the unit, direct the discharge port at a right angle to the wind direction.
- (4) Secure the space of 1 m and over at the top of unit.
- (5) Make the height of obstruction wall in front of discharge port lower than the height of unit.

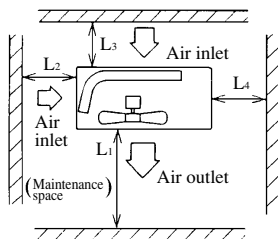


**Models FDC258HEN3A, 308HEN3, 308HES3
FDCP258HEN3A, 308HEN3, 308HES3**

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

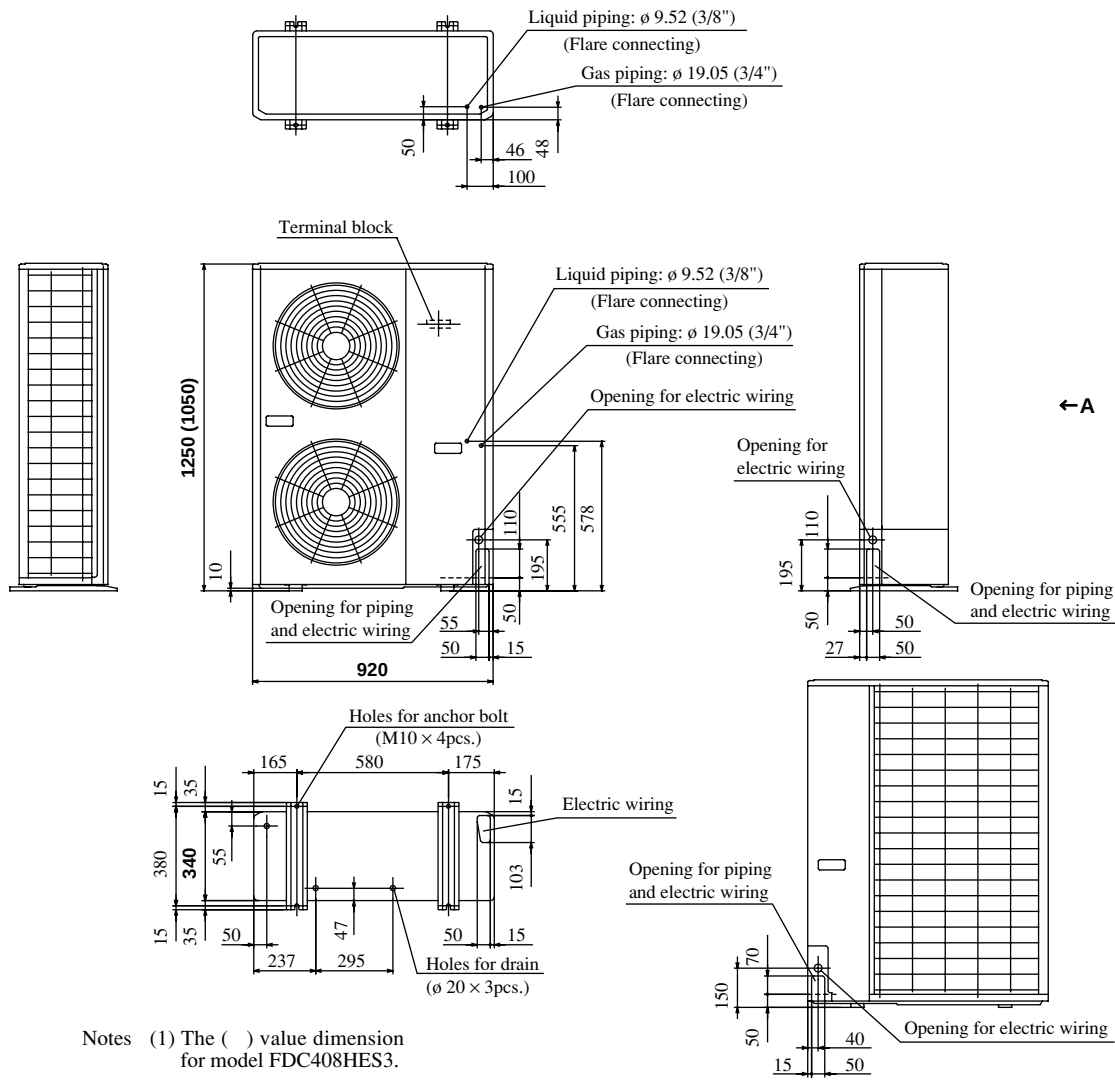
Installation type	I	II	III
Mark			
L ₁	Open	Open	500
L ₂	300	5	Open
L ₃	100	150	100
L ₄	5	5	5

Notes

- (1) Avoid the location where four sides are entirely surrounded by walls.
- (2) Fix the unit by anchor bolts without fail. Restrict the protrusion length of anchor bolt to 15 mm and under.
- (3) When strong wind blows against the unit, direct the discharge port at a right angle to the wind direction.
- (4) Secure the space of 1 m and over at the top of unit.
- (5) Make the height of obstruction wall in front of discharge port lower than the height of unit.

Models **FDC408HES3, 508HES3**
FDCP408HES3, 508HES3

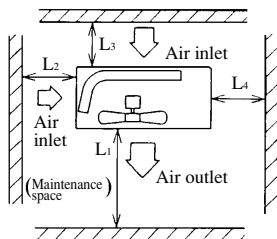
Unit: mm



Notes (1) The () value dimension for model FDC408HES3.

VIEW A

Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

Installation type	I	II	III
Mark			
L ₁	Open	Open	500
L ₂	300	5	Open
L ₃	150	300	150
L ₄	5	5	5

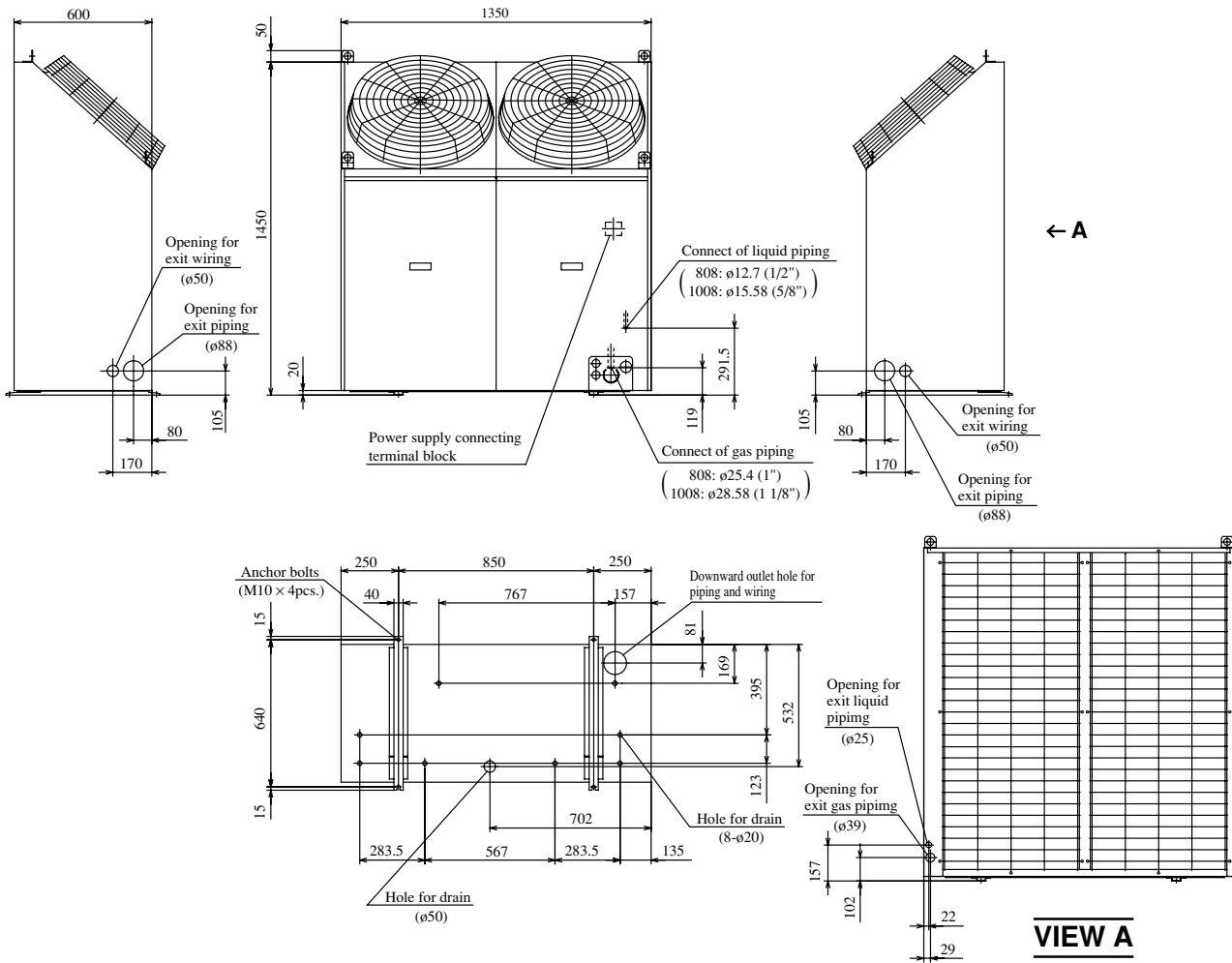
Notes

- (1) Avoid the location where four sides are entirely surrounded by walls.
- (2) Fix the unit by anchor bolts without fail. Restrict the protrusion length of anchor bolt to 15 mm and under.
- (3) When strong wind blows against the unit, direct the discharge port at a right angle to the wind direction.
- (4) Secure the space of 1 m and over at the top of unit.
- (5) Make the height of obstruction wall in front of discharge port lower than the height of unit.

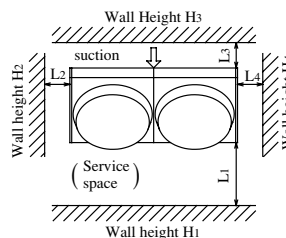
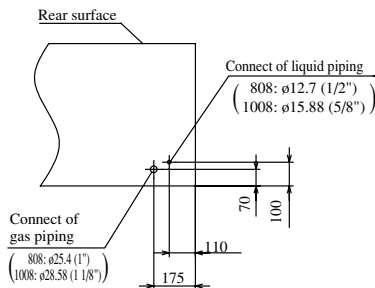
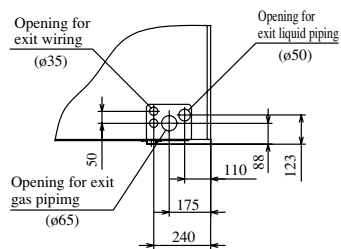


Models FDC808HES3, 1008HES3

Unit: mm



Dimensions of refrigerant piping connecting mouth (Front)



Installation Dimensions	I	II	III
L ₁	Open	Open	500
L ₂	0	0	0
L ₃	300	300	300
L ₄	Open	500	0
H ₁	—	—	1000 or less
H ₂	Not limited	Not limited	Not limited
H ₃	Not limited	Not limited	700 or less
H ₄	—	Not limited	Not limited

- Notes**
- (1) Make sure to secure the unit with anchor bolts.
 - (2) When the strong wind blows, place the unit so that discharge outlet faces the wind direction with right angle.
 - (3) Make sure to allow the space of 1 m or more above the unit.
 - (4) Connect the refrigerant piping (both gas side and liquid side) at local site.
 - (5) If the wall height H₁, H₃ of installation example III exceeds the limited value, make sure the value of L₁, L₃ are to be as follows.
 $L_1 = H_1 - 500$
 $L_3 = 300 + (H_3 - 700) / 2$, however, if L₃ exceeds 600, there is no limit for the wall height H₃.

FD Multi Systems - 8 Series

The Mitsubishi MULTI SPLIT systems are designed for open plan areas such as retail stores, open plan offices, and other commercial applications. These systems offer a low cost solution for cooling and heating, where individual control and operation of the indoor units is not required. All units on the same system will operate together –

- cooling / cooling off
- heating / heating off.

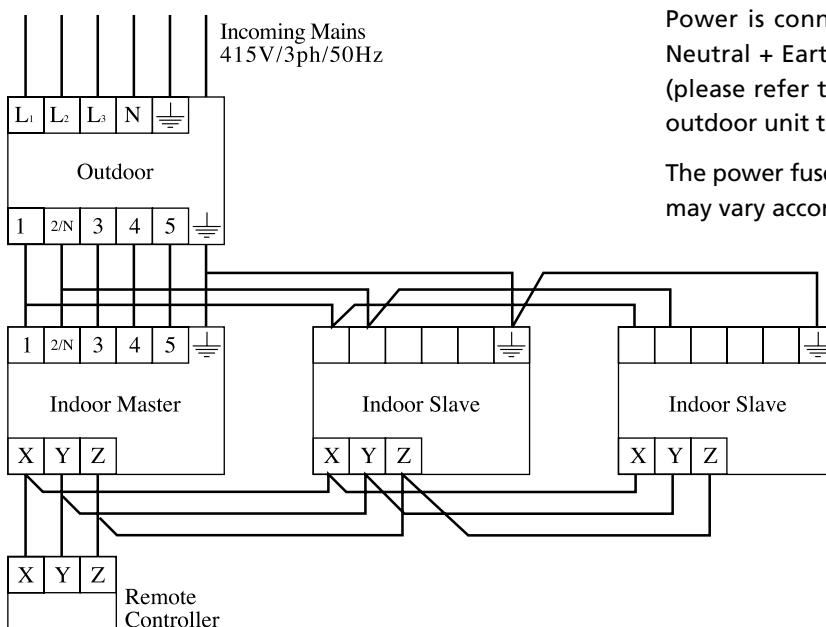
Cooling /Heating auto changeover is a standard feature of the control system, which can be altered from the remote controller to cooling only or heating only.

The indoor units are connected by branch piping to one outdoor unit, the operational mode of which is controlled by one internal remote controller*, connected to one of the indoor units.

* It is possible to install a master/slave remote controller arrangement, if the client should require an alternative location for operating the system.

MULTI SYSTEM COMBINATIONS

OUTDOOR UNIT		Nom. kW C / H	INDOOR UNIT	Nom. kW C / H
FDC408HES	TWIN	10.0/11.2	FDT208	5.0/5.4
			FDT208	5.0/5.4
FDC508HES	TWIN	12.5/14.0	FDT258	6.2/7.0
			FDT258	6.2/7.0
FDC808HES	TWIN	20.0/21.2	FDT408	10.0/10.6
			FDT408	10.0/10.6
FDC808HES	TWIN	20.0/21.2	FDT308	6.6/7.1
			FDT508	12.5/14.0
FDC808HES	TRIPLE	20.0/21.2	FDT308	6.6/7.1
			FDT308	6.6/7.1
			FDT308	6.6/7.1
FDC808HES	QUAD	20.0/21.2	FDT208	5.0/5.3
			FDT208	5.0/5.3
			FDT208	5.0/5.3
			FDT208	5.0/5.3
FDC1008HES	TWIN	25.0/28.0	FDT508	12.5/14.0
			FDT508	12.5/14.0
FDC1008HES	TRIPLE	25.0/28.0	FDT208	5.0/7.0
			FDT408	10.0/10.6
			FDT408	10.0/10.6
FDC1008HES	TRIPLE	25.0/28.0	FDT258	6.2/7.0
			FDT258	6.2/7.0
			FDT508	12.5/14.0
FDC1008HES	TRIPLE	25.0/28.0	FDT308	6.6/7.1
			FDT308	6.6/7.1
			FDT408	10.0/10.6
FDC1008HES	QUAD	25.0/28.0	FDT258	6.2/7.0
			FDT258	6.2/7.0
			FDT258	6.2/7.0
			FDT258	6.2/7.0



Electrical power supply

Power is connected to the outdoor units 415V 3ph + Neutral + Earth. The Indoor units require a 1ph supply (please refer to wiring diagram), to be taken from the outdoor unit terminal block.

The power fuse ratings are recommended as follows, but may vary according to site conditions:

OUTDOOR UNIT MODEL REF:	CLG.	HTG.	MCB RATING
FDC408HES	7.0A	6.8A	15A/ph
FDC508HES	9.4A	9.0A	20A/ph
FDC808HES	13.5A	11.2A	32A/ph
FDC1008HES	19.0A	16.0A	32A/ph

INDOOR UNITS RUN CURRENT		
FDT208 & 258	0.5A	
FDT308	0.6A	
FDT408	1.2A	
FDT508	1.4A	

Safety Precautions

All air conditioning systems described in this manual are connected to electrical mains power. **The electrical power terminations are exposed once the protective enclosure cover is removed.**

Warning

- All necessary precautions must be taken for the prevention of injury or death by electric shock.
- Electrical wiring must be installed only by qualified personnel.
- The installation of all wiring must conform to IEE Regulations and to relevant local electrical safety regulations.
- Ensure correct earth grounding. Do not connect earth wire to gas or water pipes, lighting rod or telephone grounding. Incorrect earth grounding can result in electric shock.
- Ensure an earth leakage circuit breaker is installed in the incoming mains power supply.
- Ensure all power supply connections include a fused isolator and/or mains circuit breakers, adjacent to the equipment, for both outdoor and indoor units.
- Cable connections must be secured, to prevent any tension being taken by the terminal screw connections.
- Do not install the units in an area where there may be leakage of combustible gases. A concentration of combustible gases around the units can result in the outbreak of fire.
- Safety precautions must be observed with regard to pressurised refrigerant systems. Operatives must wear suitable protective clothing and eye protection.
- It is illegal to allow HCHF refrigerant to escape to atmosphere. All refrigerant removed from equipment must be correctly decanted into cylinders specifically designated and labelled for this purpose.

ELECTRICAL MAINS POWER

Indoor units	- 220V / 1ph / 50HZ
Interconnecting cables (including control cables)	- 220V / 1ph / 50HZ
Outdoor units	
FDC type CEN & HEN	- 220V / 1ph / 50HZ
FDC type CES & HES	- 380V / 3ph / 50HZ

Caution

- Ensure that the building structure is capable of supporting the weight of the installed equipment, and that vibration transmission through the structure will not cause a disturbance.
- Where a large system is installed in a small room, it is necessary to provide protection for the rare case of refrigerant leakage into the confined space. This is in order to comply with the concentration threshold as defined by BS4434.
- Ensure condensate drainage is carried out correctly. Ensure that odours, vapours or gases are prevented from entering the termination of the drain outlet.
- Do not install the outdoor units where there is a possibility of causing a noise disturbance to adjacent buildings, in particular if equipment is expected to operate at night time within a residential area.
- Outdoor units must be properly supported and secured to allow for prevailing winds, and for the possibility of other site personnel (e.g. window cleaners) standing on the units. Warning signs should be fixed where appropriate.
- The equipment is not suitable for installation in environments where the atmosphere is contaminated, e.g. chemical processes, engineering workshops, or areas where there is a high level of electronic noise. Outdoor units should not be installed in areas close to the sea, as the salt laden air will cause damage to the heat exchangers.
- **IMPORTANT** Do not run the unit until the required amount of refrigerant is added to the system, and the outdoor unit shut-off valves are in the open position. When power is connected, the system will operate immediately.

